March 1983

Incorporating Spectrum User

sinclair user

Issue No 12

Only 75p

MORE PROGRAM PAGES THAN EVER



HOBBIT GRABS THE IMAGINATION

Sinclair improves its software

How to program the basic way

Bumper month for hardware

Code Junkies — a reader replies

Spectrum facelift for the U.S.

Lose pounds with our slimming offer

JOIN OUR USER CLUB

COMPETITION-PRO JOYSTICK

• PRECISION GAME CONTROL!



For **ZX SPECTRUM**
Complete with stylish interface unit simply plug in for instant arcade action.

ONLY £25.00 inc. VAT

Outstanding Features

- Super strong nylon and steel construction, built to last.
- A total of 8 directions plus 2 large fire buttons.
- Arcade proven moulded leaf switches ensure incredible reliability.
- Complete with self contained boxed interface which simply plugs into the Spectrum expansion port (with or without printer).
- Easily programmed in BASIC or M/C

These arcade games, designed exclusively for the **Joystick** by leading software houses, are now available for Spectrum:

3D-Tunnel	M/C	16/48K	£4.95
Gulp Man	M/C	16K	£4.95
Time Gate	M/C	48K	£6.95
Meteroids	M/C	16K	£5.95
Spooky Man	M/C	16K	£4.95

Watch this space for more software!

KEMPSTON
MICRO ELECTRONICS
180a Bedford Road, Kempston, Bedford MK42 8BL

I wish to order:

Quantity	Item	Price
	Post & Packing	£1.00
	Total (VAT inclusive)	

Cheques/Postal orders should be made payable to Kempston (Micro) Electronics

Name ______________________

Address ______________________

SU3

Post to Kempston (Micro) Electronics, Dept
180a Bedford Road, Kempston, Bedford MK42 8BL

sinclair user

Editor
Nigel Clark

Consultant editor
Mike Johnston

Production editor
Harold Mayes MBE

Staff writer
John Gilbert

Design
William Scolding

Editorial director
John Sterlicchi

Advertisement manager
John Ross

Sales executive
Annette Burrows

Editorial/production assistant
Margaret Hawkins

Managing director
Terry Cartwright

Chairman
Richard Hease

Sinclair User is published monthly by ECC Publications Ltd.

Telephone
All departments
01-359 7481

If you would like to contribute to any of the Sinclair User group of publications please send programs, articles or ideas for hardware projects to:
Sinclair User and Programs
ECC Publications
30-31 Islington Green.
London N1 8BJ

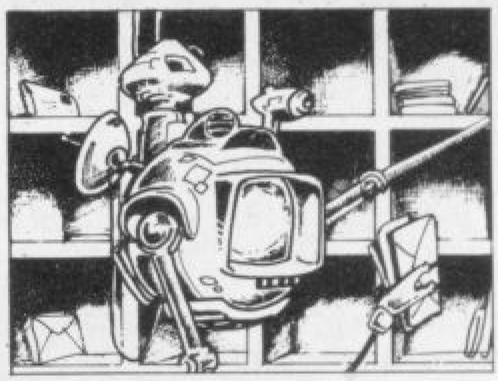
Programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included.
We pay £10 for the copyright of each program published and £50 per 1,000 words for each article used.

ISSN No. 0262-5458
Origination by
Outline Graphics.
Printed by
Eden Fisher (Southend) Ltd

Distributed by
Spotlight Magazine Distribution Ltd,
1 Benwell Road,
Holloway,
London N7
01-607 6411

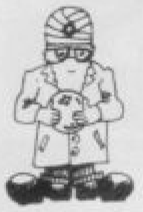


page 44


page 50

NEXT MONTH

We begin a new series, Sinclair user of the month, with articles on people nominated by readers, and Stephen Adams reviews the Memic memory unit from Camel.



Spectrum price speculation

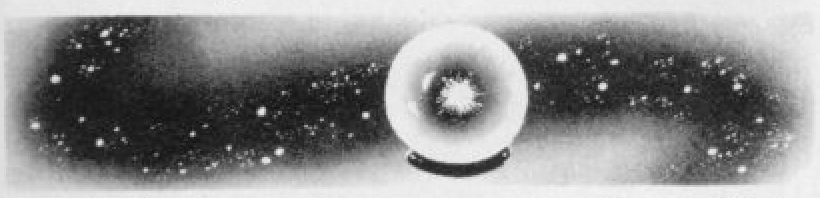
IN A HECTIC START to the year it is difficult to pinpoint the items which eventually will be seen to have been of the most significance. Troubles at Timex in Dundee led to rumours of Sinclair production going overseas. A successful share sale made Clive Sinclair a very rich man and has shown there is plenty of capital available for any future expansion plans.

Timex in the U.S. announced the launch of an updated Spectrum for the American market at prices substantially lower than those in Britain. The event which could have the most immediate impact is the launch of the TS2000. Although it will not go on sale until May or June, it has already given rise to speculation that prices could soon be reduced in Britain.

At $149.95 for the 16K and $199.95 for the 48K, that translates into about £95 and £125. If they can be made profitably for those prices in the States there is no reason to suppose that similar prices cannot be charged here.

Apart from it being possible, it also makes commercial sense to do it sooner rather than later. A number of machines are coming to the market which could be said to be competitors, notably the Oric.

A fall in Sinclair price in the next few months, coupled with the existing hardware and software support, would



be sufficient to raise demand considerably, confirming the company's position as market leader.

It should be added, however, that it will be competitive pressures alone which will decide the future pricing system for the Spectrum. The company showed that was so with the ZX-81 and it will be no use hoping that the TS2000 will pose a threat to sales in Britain. The Timex machine has been made compatible with the U.S. television system and will not work here.

None of those moves is likely to worry the small group of financial institutions which paid £13.6 million for a 10 percent stake in Sinclair Research. Seen from a number viewpoints, the success of the share sale is amazing.

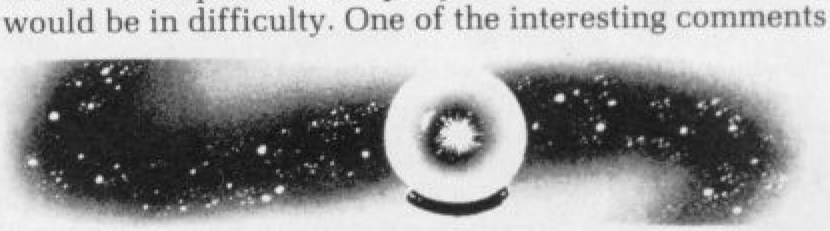
Only three years ago the company was reporting profit of £34,000 on sales of £257,000. By 1981 those figures had soared to profit of almost £9 million on sales of £27.6 million. Profit for last year is being estimated at £14 million.

The success is spectacular but anything which rises so quickly can just as easily fall away again. In addition, the Sinclair policy of subcontracting everything it can do means that the asset base is very small. Four research centres and offices in London are the total physical assets.

A collection of insurance companies and pension funds are backing the human assets of the company. The one major asset is Clive Sinclair, supported by all those around him who translate his ideas to form saleable items on the shop shelves.

As we hope we have shown in our Inside Sinclair series of articles, Sinclair Research is much more than a one-person company. It cannot be denied, however, that Clive is the man with the ideas and it has been his special brand of ideas which has been the hallmark of the success of his company.

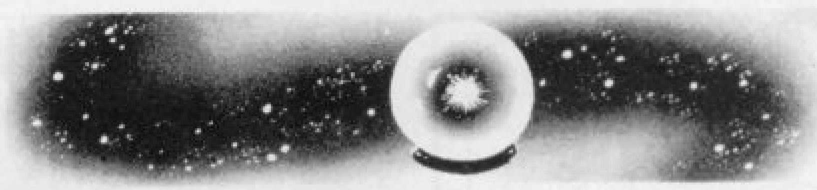
Should his ideas for computers evaporate or his attention be diverted to other projects, like the electric car for example, the company lead in microcomputing would be in difficulty. One of the interesting comments



made by Jim Westwood in his interview last year was that he still flinches at some of the ideas Clive has had. It needs only two high-cost failures and Sinclair Research would be back where it started.

As is being shown by the present problems at Timex in Dundee, Sinclair is also vulnerable to circumstances outside its control. Although none of the 700 workers on the ZX-81 and Spectrum production lines are affected directly by the redundancies in the watch-making factories, they are involved in the fight against the plans of Timex for reduction of the workforce.

Sinclair Research has said that it has contingency plans so that output will not be affected if a strike starts



and production is moved. The changes, however, could not be without short-term disadvantages.

All this speculation about the future of Sinclair Research assumes that the people behind it see it as a leading British maker of microcomputers with a few other research ideas as a sideline.

It could be that the company was called Sinclair Research because that is what it was intended to be — a pure research company which then licensed others to do the day-to-day production of whatever it evolved.

If that is the case, the company future depends just as much on the success of the flat-screen television and the electric car as on developing a new computer. This year is likely to provide a better idea of the truth of that notion.

dk'tronics

ZX KEYBOARD FOR USE WITH 80/81 SPECTRUM

Our new cased keyboard has 52 keys, 12 of these are used for the numeric pad. The numeric pad offers some useful features, you can cursor with one hand and it will be a boon for anyone who enters a lot of numeric data. The pad is a repeat of the 1-9 keys plus it has a full stop and a shift key. The numeric pad keys are coloured in red, the normal keyboard keys are grey, with the case being black which makes the whole thing very attractive. The case measures 15 × 9 × 2½. The computer (either 80/81 or spectrum) fits neatly inside. You will have to remove the computer from its original case, it is then screwed to the base of the case. The case had all the bosses already fitted and the screw holes are marked. Also fitted inside the case is a mother board (81 model only) which allows 16K, 32K and 64K to be fitted in the case. All the connections are at the rear of the case i.e. Power, Mic, Ear, T.V. and the expansion port. The case is large enough for other add ons also to be fitted inside. One of these could be the power supply, then you could very quickly fit a mains switch, or a switch on the 9V line. This means you have a very smart self-contained unit. This case does not stop you from using any other add-ons that you may have e.g. Printer etc. We are convinced that this is the best keyboard available at present. It offers more keys and features than any other keyboard in its price range.

£45



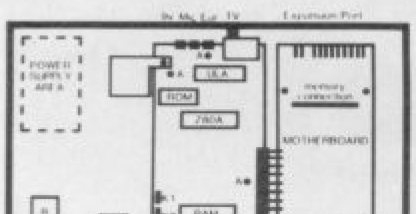
NOTE

The case can be purchased separately with the keyboard aperture uncut, so if you have one of our early uncased keyboards, or in fact any other suppliers' keyboards, these could be fitted. The keyboard is connected to your computer by a ribbon cable and this has connectors fitted which simply push into the Sinclair connectors. It is a simple two minute job and requires no electronic skills. This keyboard does not need any soldering. Please specify on order whether you require the ZX 81 or Spectrum case.

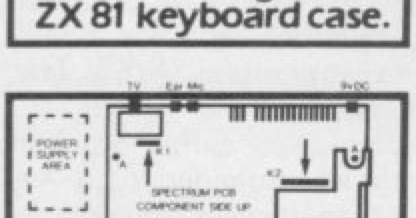
SPECTRUM MODEL

This is supplied with spectrum legends, and a slightly different base for fitting the spectrum inside, again all the connectors are at the rear of the case and there is plenty of room for the power supply (and other add-ons). Should you want to change, we can supply both the Spectrum legends and details of updating your case which will enable modification from the ZX 81 to spectrum. PLEASE specify on your order whether you require the ZX 81 or spectrum case.

KEYBOARD (SPECTRUM/81)



Internal fixing for ZX 81 keyboard case.



Internal fixing for spectrum keyboard case.

SPECTRUM LIGHT PEN

The pen enables you to produce high resolution drawings on your own television set, saving a vast amount of time over using basic programming statements, such as Plot, Draw etc. You can erase, modify and save drawings and it comes complete with software program. The superb light pen is available from D.K. tronics.



£19.95

SPECTR

16K Memory Ex
The 16K uses 411
Static Ram and o
using the Static R
speed low power
the computer. A
which comes to y
where. Position in

64K Memory Ex
All the above info
advantage lies in
56K of usable me
the use of other a
8192-65536. The
Spectrum Memo
Upgrade your Spe
it is simply slipped
are supplied, and
time. The fitting r
same as Sinclair's

ZX 80~81 Spectrum HARDWARE

SPECTRUM/81 TOOLKIT

This is the toolkit which won acclaim in the feature in the August 1982 issue (pages 29 and 30) of Sinclair User. "It is the most impressive program, fast in execution with clear and full instructions...it stands out from the rest of the field." The ZXED is a powerful editor for use on the expanded ZX81. It is intended for use by the serious BASIC programmer and offers several useful and time saving features most helpful during all stages of program development. The facilities provided are as follows: ALTER, BYTES, COPY, DELETE, FIND, HELP, INSERT, KEEP, MOVE, RENUMBER AND VERIFY. The Spectrum Toolkit contains most of the features above plus autoline numberer and append, and will run in the 16K and 48K spectrum.

Both at only £6.95



4K GRAPHICS ROM £24.95

The DK Graphic module is our latest ZX 81 accessory. This module unlike most other accessories fits neatly inside your computer under the keyboard. The module comes ready built, fully tested and complete with a 4K graphic ROM. This will give you an unbelievable 448 extra pre-programmed graphics, your normal graphic set contains only 64. This means that you now have 512 graphics and with their inverse 1024. This now turns the 81 into a very powerful computer with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders graphics and that only accounts for about 50 of them, there are still about 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there, it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

WHY WAIT?
ORDER TODAY FOR FAST DELIVERY

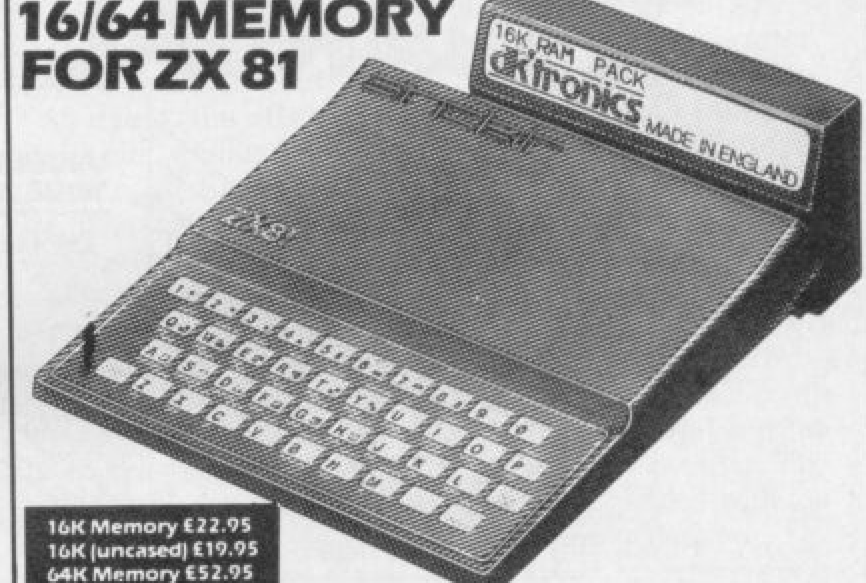
FLEXIBLE RIBBON CONNECTOR

If you have ever had whiteouts or system crashes this could be the answer. It stops the movement between the computer and the RAM expansion, it is supplied with a ribbon, 6 inches long, with a male connector at one end and a female at the other, at only

£10



16/64 MEMORY FOR ZX 81



16K Memory £22.95
16K (uncased) £19.95
64K Memory £52.95
64K (uncased) £49.95

The above illustration shows the casing for the 16K or massive 64K.

TRUM MEMORY

Expansion £22.95

-116 Dynamic Ram Chips. We use the dynamic as they are much denser than occupy less space. They are also much cheaper than the equivalent product c Ram. The Ram is manufactured with high quality materials, and uses high ver Rams. It is supplied ready-built and only needs to be plugged into the rear of All the components are fitted into holders. This massive add-on memory to you fully assembled and tested is the cheapest 16K memory available any-n in memory from 16384 to 32768. (Same as the Sinclair memory.)

16K (UNCASED) £19.95

Expansion £52.95

information on the 16K also applies to the 64K Memory Expansion, but the in the 64K giving nearly FOUR times the memory. This advanced model has memory. In addition, the block from 8K to 16K can be switched out to enable er add-ons. The graphics ROM is to be used in this area. Position in Memory: he Block From 8192-16384 is switchable.

64K (UNCASED) £49.95

emory Expansion £35.00

Spectrum to 48K of user Ram. The Spectrum memory expansion is simple to fit, ped inside the case, and then only requires plugging in. Full fitting instructions nd the only tool you will need is a screwdriver and just two minutes of your g requires no electronic skills. Position in memory from 32768 to 65536. (The ir's upgrade to 48K).

Please state type of machine, which Rom memory size, quantity and place when ordering.

Please send me . . . . @ £ . . . .

Please send me . . . . @ £ . . . .

Please send me . . . . @ £ . . . .

Please add on £1.25 for P/P

In enclose cheque/P.O. payable to DK Tronics total £ . . . .

or debit my Access/Barclaycard

Signature . . . .

Name . . . .

Address . . . .

Send to DK Tronics, 23 Sussex Road, Gorleston, Gt. Yarmouth, Norfolk.
Tel: Gt. Yarmouth (0493) 602453

dk'tronics

New colour brochure now available, send SAE for quick return

Is your Spectrum holding back?

Unlock all the secrets of your Spectrum with the most complete Spectrum Software Library available.

Written by the sharpest minds in micro technology today, this comprehensive library of software will allow you to maximise the entire range of your Spectrum's impressive capabilities. If you demand the best from your Spectrum, cut out and mail the coupon today, because once you've unlocked all the secrets of your Spectrum – there'll be no holding you back.



NEW RELEASE: The Complete Spectrum ROM Disassembly

This is the book for the serious programmer who wants to get right to the heart of the Spectrum system; its 16K ROM control program.
Written by Dr. Ian Logan and Dr. Frank O'Hara, each ROM routine is completely disassembled and its function clearly explained. Great care is also taken to ensure the reader understands how all the routines within the ROM interact with each other.
The book also explains every aspect of the Spectrum's software operation in detail and makes all functions and entry points available for use in your own programs and routines. **£9.95**

NEW RELEASE: Spectrum Hardware Manual

An essential aid for every Spectrum user, giving an easy to follow explanation of how this sophisticated micro computer really works, written by Adrian Dickens.
Backed up with a complete rundown on each component's function and full circuit diagrams, the book reveals many features of the Spectrum system not mentioned in the Sinclair Manual.
The book also includes practical hardware projects and tips enabling you to take full advantage of the system's hardware potential. **£5.95**



Understanding Your Spectrum
A complete overview of Spectrum software systems explaining both BASIC and machine language programming. **£7.95**

Over the Spectrum
30 exciting programs and games to test you and your Spectrum plus many programming hints and tips too. **£6.95**

Spectrum Machine Language For The Absolute Beginner
Everything the first time user needs to know about Spectrum Machine language. **£6.95**

MELBOURNE HOUSE PUBLISHERS

Orders to: 131 Trafalgar Road, Greenwich, London SE10

Correspondence to: Glebe Cottage, Station Road, Cheddington, Leighton Buzzard, BEDS LU7 7NA

Trade enquiries welcome.

☐ Please send me your **free** catalogue.
Please send me:

Books

SPECTRUM
- ☐ Understanding Your Spectrum £7.95
- ☐ Spectrum Machine Language For The Absolute Beginner £6.95
- ☐ Over The Spectrum £6.95
- ☐ The Complete Spectrum ROM Disassembly £9.95
- ☐ Spectrum Hardware Manual £5.95

DRAGON
- ☐ Enter The Dragon £5.95

ZX81
- ☐ Machine Language Made Simple for the ZX80 & ZX81 £8.95
- ☐ Not Only 30 Programs £4.95
- ☐ Understanding Your ZX81 ROM £8.95
- ☐ Complete Sinclair Basic Course £17.50
- ☐ Basic Course cassettes £2.50
- ☐ Complete Sinclair ZX81 Rom Disassembly Part A & B £9.95
- ☐ Ins and Outs of the Timex TS1000 £5.95

VIC 20
- ☐ VIC Innovative Computing £6.95

Cassettes

16K SPECTRUM
- ☐ Over The Spectrum No. 1 £5.95
- ☐ Over The Spectrum No. 2 £5.95
- ☐ Over The Spectrum No. 3 £5.95
- ☐ Programs from Spectrum Machine Language Book £5.95

48K SPECTRUM
- ☐ Penetrator £6.95
- ☐ The Hobbit £14.95

STANDARD VIC 20
- ☐ VIC Innovative Cassette 1 £5.95
- ☐ VIC Innovative Cassette 2 £5.95
- ☐ VIC Innovative Cassette 3 £5.95
- ☐ VIC Games Pack £5.95
- ☐ The Wizard & The Princess £5.95

All prices include VAT where applicable

£ ______

Please add 80p for post and pack £ .80

TOTAL £ ______

All Melbourne House cassette software is unconditionally guaranteed against malfunction.
Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397.

I enclose my cheque/money order for £ ______.

Please debit my Access card No. ______ Expiry date ______

Signature ______ Name ______

Address ______

______ Postcode ______ SU3

MELBOURNE HOUSE PUBLISHERS

The sinclair user Club

Discount offered on serious software

MiCROL Database price is reduced by £2

THE DATABASE, from MiCROL, has been designed to function using a new concept in programs of that type. We thought that as the Database is something completely new that we should give members of the Sinclair User Club a chance to buy it at a discount.

The Database consists of a program on cassette and a user manual. The program is very easy to use and does not employ a menu as many other databases do. It will allow more than 900 items of data to be entered in special documents within a file and there can be several documents within each data file.

The Use and Learn package is the second item from MiCROL we have on offer. It also consists of a cassette and a booklet. The booklet contains notes on the programs from the cassette and also has articles about program structuring and searching and sorting through data.

We are offering both packages at the discount price of £7.95, with 50 pence postage and packing, a reduction on the retail price of £2.

The second company whose goods we offer at a discount this month is PSS. Club members can send for any PSS cassette with a price reduction of 20 percent. The software includes the **MCODER** compiler, **Krazy Kong, Ghost Hunt** and **Drag Race.**

We also offer 10 percent discount on the **QSAVE** fast saving and loading system. It allows the ZX-81 to tape programs at up to 16 percent faster than when using the normal SAVE and LOAD routines.

As usual, the offers are available exclusively to members of the Club and our offers are well below the usual retail prices.

New members can take advantage of them by including orders with membership forms.

MiCROL is at 31 Burleigh Street, Cambridge CB1 1BR. PSS is at 452 Stoney Stanton Road, Coventry CV6 5DG.

MiCROL	**List price**	**Offer price**
Spectrum		
Use and Learn	**£9.95**	**£7.95**
Database (48K)	**£9.95**	**£7.95**

PSS	**List price**	**Offer price**
ZX-81 (16K)		
Krazy Kong	**£3.95**	**£2.75**
Ghost Hunt	**£3.95**	**£2.75**
Maze Drag Race	**£3.95**	**£2.75**
Alien	**£3.95**	**£2.75**
DCODER	**£5.95**	**£4.75**
Zonix	**£12.95**	**£10.43**
MCODER	**£7.95**	**£6.75**
QSAVE	**£15.95**	**£14.35**

Cheaper insurance

MEMBERS of the Sinclair User Club can now insure to cover their machines against accidental damage. The club will offer insurance for the Spectrum for £9.75 and the ZX-81 for £7.50. That will cover accidental damage, accidental breakage, fire and theft. The insurance will also cover repairs to a machine once the guarantee has expired.

Insurance companies can charge up to £15 a year to insure a computer. The high price of the insurance is set to take into account other general valuables, such as jewellery, which is not taken into account with house insurance. Our cover will take account only of the machine.

Our Helpline Service continues to operate and is proving to be very popular. The number is provided with the cassette newsletter.

MEMBERSHIP FORM

I wish to join the Sinclair User Club and enclose my subscription of £12

Name ....

Address ....

....

....

....

Which computer do you own?

ZX-81 ☐ Spectrum ☐

Send your coupons to Sinclair User Club, ECC Publications, 30-31 Islington Green, London N1 8BJ. Cheques should be made payable to Sinclair User Club.



The Sinclair User Club

Britain

Aylesbury ZX Computer Club: Ken Knight, 22 Mount Street Aylesbury (5181 or 630867). Meetings: first Wednesday and third Thursday of the month.

Doncaster and District Micro Club: John Woods, 60 Dundas Road, Wheatley, Doncaster DN2 4DR; (0302) 29357.

Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham, NG16 3BJ.

Edinburgh ZX Users' Club: J Palmer (031 661 3183) or K Mitchell (031 334 8483). Meetings: second Wednesday of the month at Claremont Hotel.

EZUG-Educational ZX-80/81 Users' Group: Eric Deeson, Highgate School, Birmingham B12 9DS.

Furness Computer Club: R J C Wade, 67 Sands Road, Ulverston, Cumbria (Ulverton 55068). Meets every other week on Wednesday evenings.

Glasgow ZX-80/81 Users' Club: Ian Watt, 107 Greenwood Road, Clarkston, Glasgow G76 7LW (041 638 1241). Meetings: second and fourth monday of each month.

Hassocks ZX Micro User Club, Sussex: Paul King (Hassocks 4530).

Inverclyde ZX-81 Users' Club: Robert Watt, 9 St. John's Road, Gourock, Renfrewshire, PA19 1PL (Gourock 39967). Meetings: Every other week on Monday at Greenock Society of the Deaf, Kelly Street, Greenock.

Keighley Computer Club: Colin Price, Redholt, Ingrow, Keighley (603133).

Lambeth Computer Club: Robert Barker, 54 Brixton Road, London, SW9 6BS.

Merseyside Co-op ZX Users' Group: Keith Driscoll, 53 Melville Road, Bootle, Merseyside L20 6NE; 051-922 3163.

Micro Users' Group: 316 Kingston Road, Ewell, Epsom, Surrey, KT19 0SY.

National ZX-80 and ZX81 Users' Club: 44-46 Earls Court Road, London W8 6EJ.

Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30 to 10.00pm. Further information from R G Martin (0782 626065).

North Hertfordshire Home Computer Club: R Crutchfield, 2 Durham Road, Stevenage; Meetings: first Friday of the month at the Settlement, Nevells Road, Letchworth.

North London Hobby Computer Club: ZX users' group meets at North London Polytechnic, Holloway Road, London N7 each Monday, 6pm.

Nottingham Microcomputer Club: ZX-80/81 users' group, G E Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.

Orpington Computer Club: Roger Pyatt, 23 Arundel Drive, Orpington, Kent, (Orpington 20281).

Perth and District Amateur Computer Society: Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.

Regis Amateur Microcomputer Society: R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex, PO21 4UU.

Scunthorpe ZX Club: C P Hazelton, 26 Rilestone Place, Bottesford, Scunthorpe; (0724 63466).

Sheffield ZX Users' Club: A W Moore, 1 Ketton Avenue, Sheffield, S8 8PA, Yorkshire. Annual subscription £10, monthly newsletter and cassette.

Sittingbourne: Anurag Vidyarthi (0795 73149). Would be interested to hear from anyone who wants to start a club near the Medway towns.

Stratford-on-Avon ZX Users' Group: Chris Parry, 16 Sackville Close, Stratford-on-Avon, Warwickshire.

Swansea Computer Club: B J Candy, Jr Gorlau, Killay, Swansea (203811).

Swindon ZX Computer Club: Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and software library.

Worle Computer Club: S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068). Meetings: Woodsprings Inn, Worle, on alternate Mondays.

ZX-Aid: Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH (Walsall 25465). Please include sae. Meetings twice monthly.

ZX Guaranteed: G A Bobker, 29 Chadderton Drive, Unsworth, Bury, Lancashire. Exchanges information and programs throughout the country.

ZX-80/ZX81 Users' Club: PO Box 159, Kingston-on-Thames. A postal club.

Overseas

Belgian National Sinclair Users' Club: P Glensson, Rue Abbe De l' Epeestraat, 14, 1200, Brussels.

Belgium, France, Luxembourg: Club Sinclair, Raymond Betz, 38 Chemin du Moulin 38, B-1328 Ohain, Belgium (322 6537468)

Belgium, Netherlands: Microcomputer Vereniging BZW, Paul Glenisson, Priester de l'Epéestraat 14, B-1200 Brussels, Belgium (322 7349954)

Denmark: Danmarks National ZX-80/81 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.
ZX-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre. Gratis medlemskab og gratis blad til enhver interesseret.

East Netherlands: Jonathon Meyer, Van Spaen Straat 22,6524 H.N. Nijmegen; (080 223411).

Germany: ZX-80 Club, a postal club; contact Thomas Jenczyk. Hameln, Postfach 65 D-3250 Hameln, Germany.

Indonesia: Jakarta ZX-80/81 Users' Club, J S Wijaya, Jakarta, Indonesia.

Irish Amateur Computer Club: Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3. (331304).

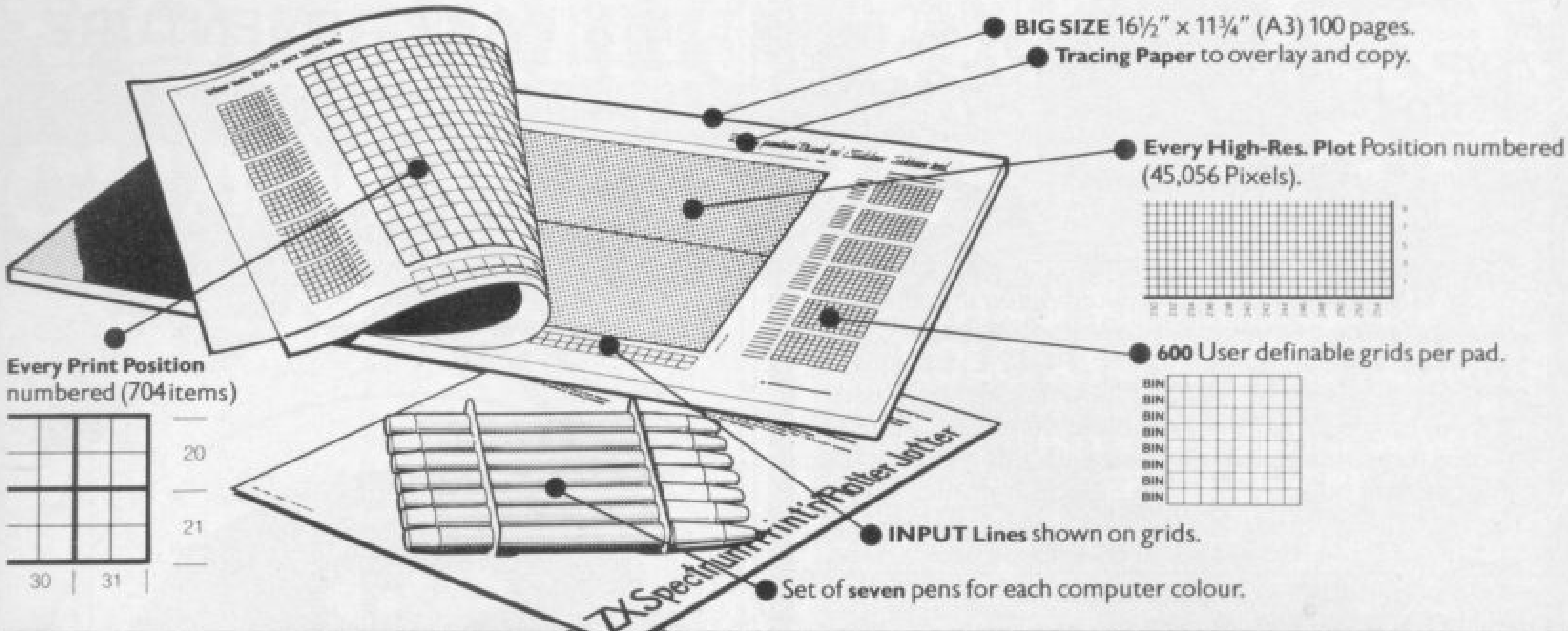
Republic of Ireland: Irish ZX-80/81 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.

Singapore: Sinclair Users' Group: Eric Mortimer, 1D Wilmer Court, Leonie Hill Road, Singapore.

South Africa: Johannesburg ZX80/81 Computer Users' Club: S Lucas, c/o Hoechst SA (Pty) Ltd, PO Box 8692, Johannesburg. Teaches Basic and machine code, interest in hardware.
Johannesburg ZX Users' Club: Lënnërt ER Fisher, PO Box 61446, Marshallstown, Johannesburg.

Spain: Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.

United States: Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611. — Harvard Group, Bolton Road, Harvard MA 01451; (617 456 3967).



It will improve your ZX SPECTRUM graphics in ways you wouldn't believe possible.

Your new ZX Spectrum is literally packed with sophisticated graphics. Colour. High resolution. Plot. Draw. Circle. Border. Ink. Paper Colours. User-defined characters to name just a few!

That's why we have packed the new Spectrum Print 'n' Plotter Jotter with every facility to exploit your graphics to the full.

After the first few weeks of "playing" with your computer you will want to get down to serious programming and planning in which professional-looking graphics should play a major part.

What better way to work it out than with a Print 'n' Plotter Jotter?

The professional pad

Print 'n' Plotter is not just another programming pad.

Just look at the specifications:

BIG SIZE 16½" x 11¾". 100 Pages — 50 Print Grids and 50 High Resolution Plot Grids.

Printed on high-quality tracing paper, enabling you to overlay the pages for direct co-ordination between PRINT and PLOT or to copy from illustrations, maps, charts, photos etc.

PRINT Grids show all numbered co-ordinates for the 704 screen positions, plus INPUT lines.

PLOT Grids show every numbered co-ordinate for the 45,056 Pixels!

Each pad contains 600 user-definable grids for use with the BIN n, POKE USR "a" function.

And the whole thing is fully bound with fly leaf cover and complete with a set of seven colour pens!

The simple way to get serious

Spectrum Graphics can become very complex, so before you start to program the best way is to work it out on a Print 'n' Plotter and save all those errors!

Take for instance the common CIRCLE. With a Jotter you can establish the exact screen location for the centre in seconds, and it will stop you running out of screen because of a too large radius. Working our DRAW is similar: pre-determine DRAW lines and PLOT positions before you start. With a Jotter you can build-up graphics using every facility with a direct co-ordination between each.

For instance, correct PLOT OVER or PRINT OVER positions will be easy with a Jotter.

See the show for just 95p!

To demonstrate the graphic possibilities with the SPECTRUM JOTTER we have produced a cassette-based Demonstration program for only 95p (inc VAT and P&P). Why not send for a copy, or order it together with your JOTTER?

Just part of a range of ZX products

The Spectrum Jotter is, of course, an upgraded version of our popular *ZX81 Print 'n' Plotter Jotter and Film*. For ZX81 owners these are available by direct mail or through a growing number of retailers and compshops.

The ZX81 Jotter is a 100 page Graphics pad that exploits to the full the graphics facilities of that micro. ZX81 Film is a matt film version of the Jotter which is re-usable and ideal for 'copying' graphics.

Our manual: "*ZX Graphics programming made easy*" explains everything you need to know about using the ZX81 products, and when used in conjunction with the Spectrum cassette will prove to be the definitive guide to the subject.

And for ZX users (whether Spectrum or ZX81) we still market Printer Paper at £1 less than Sinclairs!

Why not write and place your order today? Graphics can be a very serious subject . . . Print 'n' Plotter products can make it easier . . . and better in a hundred ways you never thought possible!



An illustrated leaflet is sent with all orders. If you require a copy before ordering write enclosing a first class stamp.

To: Print 'n' Plotter Products (SB) 19 Borough High Street, London SE1. Please forward me the following products:

. . . . . ZX SPECTRUM JOTTERS @ £9.95 each.
. . . . . ZX81 JOTTERS @ £3.50 each.
. . . . . ZX81 PLOTTER FILMS @ £2.25 each.
. . . . . "GRAPHICS PROGRAMMING MADE EASY" MANUALS @ £1.50 ea
. . . . . PACKS OF ZX PRINTER PAPER (5 ROLLS) @ £10.95 per pack.
. . . . . ZX SPECTRUM DEMO CASSETTES @ 95p each.

6th ZX MICROFAIR FEBRUARY 26th NEW HORTICULTURAL HALL LONDON SW1

PLEASE NOTE ALL PRICES INCLUDE POST, PACKING AND VAT FOR U.K. DELIVERIES (Overseas should add 25% for additional Surface Mail)

Remittance enclosed payable to Print'n'Plotter Products.
Please bill my Access/Barclaycard/Visa/Mastercard No:—

Name: . . . .

Address: . . . .

Print'n'Plotter Products©

Most Print 'n' Plotter products are available 'over the counter' from the following retailers: Branches of W. H. Smith ● Buffer Micro Shop, Streatham, London ● Denny's Booksellers, London EC1 ● Georges Bookshop, Bristol ● Telford Electronics & Computing, Hollinswood, Telford ● Personal Computer Services, Darwen, Lancs

VOLCANIC DUNGEON CHAMPIONSHIP

CARNELL SOFTWARE



WIN A FABULOUS 'WINGS' HOLIDAY FOR 2 TO FLORIDA.

VISIT THE AMAZING NEW EPCOT CENTRE

Volcanic Dungeon, the addictive adventure. People have been known to venture into its maze of caverns to rescue the Princess Edora again and again. If you are one of them, or wish to be, then you could find yourself lying on a **sun-drenched beach in Miami for a week. Followed by a further week at Orlando,** visiting **Disney World** and **Epcot.** So what do you have to do for all this? **Just be the best Volcanic Dungeon player in the UK, that's all!** Ten finalists will battle it out in the championship at the London Computer Fair, Earl's Court, in June 1983. **But first you must prove you are worthy.**

Volcanic Dungeon is available on the **16K ZX-81, 48K Spectrum and Dragon 32.** An entry form is supplied with every game. (Anyone who already owns the original ZX version can enter by sending a SAE for an entry form.) **Order your copy NOW** from **CARNELL SOFTWARE, 4 Staunton Road, Slough, Berks. Only £5.00** including P&P. **Also available from good microcomputer stores.**

The 'Judges' decision is final and no correspondence will be entered into. All business associates of Carnell Software, and their relatives, are disqualified from entry. A copy of the rules of the Volcanic Dungeon championship will be supplied with the entry form.







Peace is sought at Timex

THE likelihood of a strike about redundancies at the Timex factory in Dundee was receding as we went to press. A growing number of workers have said they are willing to take voluntary redundancy and early retirement to cut the workforce.

The company is seeking to reduce the workforce to about half its present size because of a fall in the demand for watches and the loss of the Nismlo contract. Sinclair production is not directly affected.

If a strike is called, Sinclair Research has said that it will switch production to a number of other plants. A spokesman for the company emphasised that was not an idle threat and that it had plans for moving production at a moment's notice.

He added that he could not say where the plants were, as they might never be needed, but added that a number of companies with spare capacity had the necessary expertise to allow them to make the Sinclair machines.

The rumour that production may be moved to the French plant of an associate company of Timex was denied firmly.

For some time Thorn-EMI at Feltham, Middlesex, has been producing Spectrums but the wider range of alternative sources was not set up until the strike at Dundee in November.

Clive now worth more than £120 million

CLIVE SINCLAIR is now officially worth more than £120 million. The private placing of shares, announced at the launch of the Spectrum, has now been settled with a value of £136 million being put on Sinclair Research, of which his personal share is about 85 percent.

A number of unnamed financial institutions, believed to be about 30, have agreed to buy 400,000 shares at £34 each, which is a total of £13.6 million for 10 percent of the company. The sale was heavily oversubscribed.

The latest figures available show that in the year to March, 1982 Sinclair Research made a profit of almost £10 million on sales of £27.6 million. It is expected that profit for the year to March this year will rise to £14 million.

It is believed the company would like a full stock market listing within the next year.

Most of the money raised will be used to finance work on the Sinclair electric car. The extra cash is needed to ensure that resources do not have to be diverted from computers.

ZX word processor

SINCLAIR RESEARCH is aiming to prove that the 48K Spectrum can be used as a serious business machine. The company is developing a software package which will transform the Spectrum into what it hopes will be a powerful word processor.

The word processor will be capable of driving a dot matrix printer. To do that it will have to be connected to the Sinclair RS232 serial interface which is to be launched later this year.

The program allows text to be typed-in from the keyboard and then edited by moving the cursor around the screen. The finished text can then be output to large printers or the Sinclair thermal printer.

The display created by the word processing program will be 62 characters in one line and, through proportional spacing, text can be justified down the left- and right-hand sides of the screen.

Shows are still popular

THE FIRST major Sinclair show of the year is being held on Saturday, February 26. The ZX Microfair is at the usual venue, the New Horticultural Hall, Westminster, SW1, between 10am and 6pm.

The organiser, Mike Johnston, says that the last show, held in December, drew around 7,000 people and was the best ever from the point of view of exhibitors.

The second Northern Computer Fair is to be held on March 12 at Pudsey Civic Centre, Dansons Corner, Stanningly — it lies between Leeds and Bradford. Northern Premier Exhibitions says the show is generating a good deal of interest.

On March 19 the Bristol Hobbyist Microfair will be held by British Telecoms Computer Club. The show will take place at Horfield Territorial Army Centre, Horfield Common, Bristol and will be open from 10.30am to 5.30pm.

The Association of London Computer Clubs is staging its annual show, the Fourth London Computer Fair, between April 13 and 16. The show will be held at Central Hall, Westminster, former venue for ZX Microfairs. It is co-sponsored by the GLC as part of the London Computer Festival.

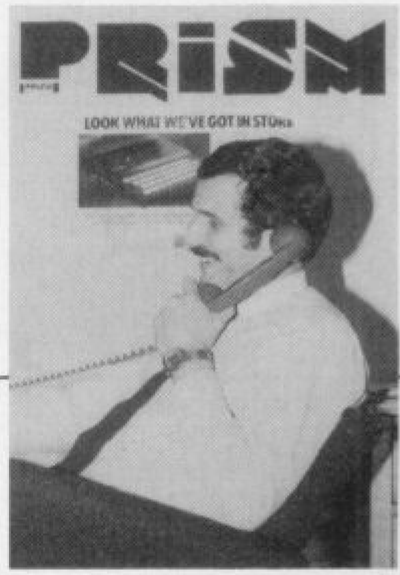
Microscene Hallam '83 will be at the Top Rank Suite, Arundel Gate, Sheffield on Saturday, April 16. The doors should be open from 9.30am to 5.00pm.

The Scottish Personal Computer World Show is to be staged from April 16-18 at MacRoberts Pavilion, Ingleston, Edinburgh. It follows the successful London show which, the sponsors claim, attracted more than 47,000 people.





Happy festive sales season



Bob Denton

A SPECTACULAR sales boom occurred among retailers and mail order wholesalers during the Christmas period.

Stewart Biddie, merchandise controller for W H Smith said: "Sales have been incredible since the price drop of the ZX-81 and we have had difficulty in keeping sufficient stocks. The sale of software for the ZX-81 at Christmas went very well and there is no need to say how the new Spectrum lines of software have been selling.

"The number of branches selling the Spectrum has incresed because of the demand and it is being sold at 200 branches, including the 65 where it was sold originally."

Prism Microproducts, wholesale distributor of Sinclair machines and software and sister company of ECC Publications, also had a good Christmas.

Bob Denton, Prism managing director, said: "It was a computer Christmas and sales of hardware and software have gone well."

The major software houses also reported a boom in business. Douglas Berne of Silversoft said: "Things took off at the beginning of November and stayed the same well into January."

Richard Turner of Artic Computing told a similar story. "We had an incredible response and the big problem has been keeping up stocks. The demand is still heavy but we are almost back to normal."

More outlets

SPECTRUMS are now on general retail sale. From February 21, Prism Microproducts, a sister company to ECC Publications which publishes *Sinclair User*, has been handling the retail distribution of the latest Sinclair machine.

The move is part of a wide-ranging effort to make the full range of Sinclair products more available to the public.

Prism has appointed a procurement agency to deal with assessing software and hardware products in the market for general distribution. The company is also considering adopting a new system for selling on what is known as the rack-jobbing system.

The system is being tested in the London area in March and April and, if successful, will be extended to all of Britain. Bob Denton of Prism Microproducts says:

"This will provide a better service because users will see a broader selection".

Council promotes computers

THE LONDON Borough of Camden is one of the first local authorities to launch into the microcomputer scene. A club for the owners of various microcomputers, including the ZX-81 and Spectrum, has been started at Queen's Crescent Library, Camden. Meetings are held every week on Tuesdays at 7.30 pm.

The library department of Camden expressed interest in promoting microcomputer literacy through computer clubs in its libraries and the council hopes that the club will be the first of many in the borough.

Will Jackson, one of the organisers, says: "I own a ZX-81 and now have a Spectrum. I saw a need for a club which could exploit British machines, like many of the courses in this country which use American machines such as the Pet or Vic-20.

"There are not sufficient books which explain computing in a way beginners can understand. I am no expert at computing but I know something about Basic and other areas of computing through a course I did several years ago."

According to Jackson, the club should be of interest to people of all ages and professions. The use of microcomputers for serious applications will also be explored, so the more advanced programmers will have something to do.

Magazine for all ages

THE TYPICAL reader of *Sinclair User* is aged between 10 and 45, is likely to earn less than £10,000 and is almost certain to have one of the Sinclair computers. That is revealed in the survey we conducted in the autumn.

We had an excellent response, with more than 4,000 people replying.

The readership is fairly evenly spread across the ages up to 45, with 29 percent being under 16;21 percent between 16 and 25;20 percent between 26 and 35; and 16 percent between 36 and 45. Of those of employable age the vast majority had a job, with the highest percentage earning between £5,000 and £10,000.

Our survey revealed that 34 percent had had their machines for between one and six months. Almost 30 percent, however, had bought the machines between six months and a year ago. All those dates can be increased by at least three months since the survey. At the time only four percent of readers were waiting for delivery of an ordered machine.

Mail order was the most popular method of purchase by all age groups, apart from the those under 16, who preferred to go to W H Smith. The second-hand market was healthy, with seven percent of readers buying that way.

GET THE BEST NEW PROGRAMS AND THE ALL-TIME GREATS, SPECTRUM OR ZX81

AT SOFTWARE SUPERMARKET NOW

We started Software Supermarket with just one idea. To play all the Spectrum and ZX81 games we could find, to select the very best, and to offer only those to our customers.

Judging by our mail from all over the world, you're very pleased with our free selection service. It's impartial (we produce no programs ourselves) and it saves you £££'s on stamps and mistakes.

And it's fast. We usually despatch your order within 48 hours. Here's the best of the new and the best of them all for your Spectrum. Plus some great ZX81 games. Full detailed catalogue sent free with every order. Or send large SAE for catalogue only.

ZX SPECTRUM: 16/48K

Our latest Top 10 Programs for your Spectrum. They run on both 16 & 48K.

3D TUNNEL Brilliant NEW 3D graphic game by Malcolm "Escape" Evans. Fly down the winding 3D tunnel shooting bats, spiders, frogs and rats! Demo mode: 3 speeds: training program for each phase. And (48K only) watch out for the Tube train! (New Generation) £4.95

3D TANX NEW game with stunning graphics. Shoot the enemy from your 3D tank turret. 3 play levels: accurate ballistics: 1 or 2 players: hold feature: demo mode: training program. And choose your own control keys: even plays 'God Save The Queen'! (DK'Tronics) £4.95

WINGED AVENGER *"One of the best...covers all the stages of the arcade original...a game to come back to." Pop:Comp:Wkly.* Very fast 'PHOENIX'. 7 play levels: 3 attack waves: laser shield: mothership with smart bombs. (Work force) £4.50 (16K ZX81 version, £4.50)

GROUND ATTACK *"Best Spectrum version of the arcade game" Yr:Comp: "Very absorbing" E&C: "Extremely good" Pop:Comp:Wkly.* Thrilling 'SCRAMBLE'. Pilot your ship thro' 26 zones: up, down, brake, thrust: smart bombs: as you get better, it gets harder. (Silversoft) £5.95

CENTIPEDE The first - and fast - Spectrum version of the famous arcade game. Full arcade movement - left, right, up, down, fire - as you attack the centipede. Great graphics. Watch out for the jumping spider! 3 lives: hold feature. (DK'Tronics) £4.95

ESCAPE *"One of the best and most original games we have seen" S.User.* 5 very real dinosaurs chase you round the maze as you search for the axe to escape. Different maze every time. 5 play levels: 9 speeds: Hall of Fame. (New Generation) £4.95

GULPMAN *"The one cassette that I would buy...an exceptional program." Pop:Comp:Wkly* 15 mazes, each with demo mode: 9 speeds: laser gun helps against 4 chasers. Program your own control keys: personalise/save your very own game. (Campbell) £5.95

COSMOS NEW! Fantastic graphics. Loads in 2 parts (instruction manual first). Protect your 9 ships against 18 aliens, warp mines, asteroids. Your graphic on-board computer helps with elaborate displays. Our favourite new game. (Abbex) £4.95

FAUST'S FOLLY The first adventure we've seen that's worth playing in 16K. It's great and it's got graphics! Loads in two parts: clear instructions first. Then a smashing adventure with directions, inventory, look, score, save. Amazing! Abbex) £4.95

OTHELLO *"Recommended without reserve...a superb opponent" Yr:Comp.* The great 19th Century power game. Surround your opponent: capture his territory. Millions of different games: maximum 60 moves each. 1 or 2 players: demo game: 9 skill levels: print. (Mol) £7.95

ZX81 OWNERS!

Special 16K ZX81 versions of 6 of these programs are available:

WINGED AVENGER	**£4.50**	**PIMANIA**	**£8.00**
OTHELLO	**£6.95**	**CHESS 2**	**£9.95**
BLACK CRYSTAL	**£7.50**	**GREAT BRITAIN LTD**	**£4.95**

Use the coupon to order. Free detailed catalogue of our best ZX81 games with every order. Or send large SAE for catalogue only.

48K SPECTRUM ONLY

These programs use nearly all the Spectrum's 48K. They will not run on the 16K Spectrum. But there are versions of Black Crystal, GB Ltd, Pimania and SpecChess for for 16K ZX81.

PIMANIA *"The best adventure game we have reviewed" S.User. "An adventure enthusiast's dream" C&V Games.* Best use of Spectrum graphics and music we've seen. A wonderfully witty adventure - and you could win the £6,000 Golden Sundial of Pi. (Automata) £10. (ZX81 16K version: £8)

TIMEGATE *"The best graphical game I have seen on any micro" Interface. "Excellent graphics...one of the best" Yr:Comp: "Fast and furious...required playing for any Spectrum owner" Which Micro?* 5 skill levels: training program: Hold: Hall of Fame: keyboard overlay: 26-page on-screen manual: (Quicksilva) £6.95

THE HOBBIT *"Superior to any other adventure game available for the Spectrum" Yr:Comp:* Free 285-page illustrated book of The Hobbit contains clues to help solve the adventure. 30 beautiful full-screen pictures: 500 word vocabulary: 16 page instruction manual: save: print: pause. It took 4 people 18 months to write! (Melbourne House) £14.95

GREAT BRITAIN LTD *"A colourful and sophisticated management game" Pers:Comp:wld: "Difficult and challenging" ZX Comp:* Even plays 'Rule Britannia'! Choose your party and run the country. Will inflation and unemployment come down or the rioters come out? It's up to you. Then watch the results on election night! (Hessell) £5.95 (16K ZX81 version, £4.95)

SPECCHESS *"The standard for ZXChess" ZX Comp: "The strongest chess program" Pop:Comp:Wkly.* Full graphic chessmen: 7 play levels: all legal moves: position analysis for problem-solving: recommended move option: print game history. (Artic) £9.45 (ZX81 non-graphic 16K version £9.95)

BLACK CRYSTAL Take the adventure of your life. 180K of program to unravel, on two double-sided cassettes! You must solve each of the 6 stages to defeat the Lords of Chaos. Real-time monster battles: 16 command keys. (Carnell) £7.50 (16K ZX81 version: Over 100K loads in 7 parts. £7.50)

Post to: SOFTWARE SUPERMARKET, 87 Howard's Lane, London, SW15 6NU. (If you do not want to cut this magazine, write your order out carefully on plain paper and quote this number: SU4)

I own a 16K Spectrum/48K Spectrum/16K ZX81.

I enclose my Cheque/PO for £........... made payable to Software Supermarket. Please use block capitals. If we can't read it, you won't get it.

Name ....

Address ....

....

.... Postcode ....

Phone, if any, in case we have any query ....

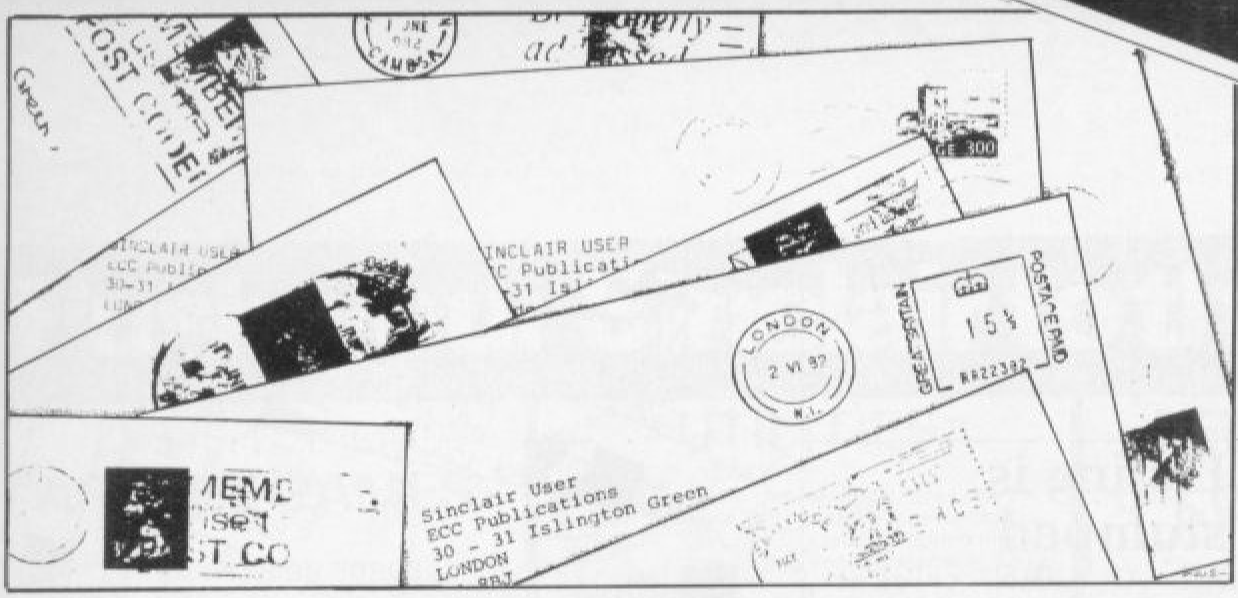
Program Name	Computer	Price

POSTAGE AND PACKING
U.K. Add 55p only per order
EUROPE. Add 55p for each program
OUTSIDE EUROPE. Add £1 for each program airmail.

P&P £

TOTAL £

SOFTWARE SUPERMARKET
87 Howard's Lane, London SW15 6NU. 01-789 8546



Logical statements

THIS INFORMATION on string arrays and logical arithmetic may be of interest.

Sinclair ZX-81 Basic lacks an IF . . . THEN . . . ELSE statement. In one specialised context, however, this can be mimicked with the use of string arrays, thus saving program space.

Since one cannot have, for example:

IF N=1 THEN PRINT A$(7) ELSE PRINT A$(8), one might seem to need two statements:

IF N=1 THEN PRINT A$(7)

IF N<>1 THEN PRINT A$(8)

In fact, they can both be replaced by the single statement PRINT A$(NOT N-1).

A similar effect can also be produced, so long as N is not zero or negative, by PRINT A$(7 + SGN(N-1)); but that prints A$(6) if N is zero or negative and in any case needs an extra pair of brackets.

The idea can be extended, provided always that the choice is between strings in the same array. For example;

IF N>8 AND N<13 THEN PRINT A$(25)

IF NOT (N>8 AND N<13) THEN PRINT A$(6)

can be replaced by

PRINT A$(25-19*NOT (N>8 AND N<13).

The same can even be done for more than two conditional statements; for example, the four lines

IF A = 3 AND B>4 THEN PRINT A$(7)

IF A = 3 AND B<=4 THEN PRINT A$(8)

IF A<>3 AND B>4 THEN PRINT A$(23)

IF A<>3 AND B<=4 THEN PRINT A$(24)

can all be replaced by the single

PRINT A$(7 + 16*(NOT A-3) + NOT B>4)

with a considerable saving of space.

R W Sharples,
London NW7.

Improving printer

WITH THE FLEX coming out of the edge connector on the left instead of the normal right-hand side, my ZX printer is now non-standard. I believe it is an improvement on the Sinclair orientation. It takes up less space and does not interfere with the keyboard accessibility, either visually or manually. It also has an extremely desirable side-effect, in that the RAM pack stability has improved. I do not know why.

The method of alteration is to undo the two screws on the printer connector terminal and carefully remove the two case halves, keeping the terminal card in the same position. Put the main cable to the opposite side of the terminal card and re-fold the wires neatly, then reverse the case halves and turn upside down, screw-heads uppermost, fit over terminal card and replace screws.

A Wood,
Blyth,
Northumberland.

User in a bind

HAS *Sinclair User* any plans to sell binders for the magazine? I have bought the magazine from its first issue and I feel that a binder would transform my collection of magazines into a useful text.

Simon Stockdale,
London, N20

• *There are no plans to sell binders at the moment. If a decision is taken in the future we will keep readers informed.*

Pascal convert

COULD YOU tell me if there is a Pascal converter on sale for the Spectrum and if it is possible to purchase a colour printer for the Spectrum?

Kevin Hardy,
Bishop's Stortford,
Herts.

• *A BOOK called* Pascal for Human Beings *is produced by Interface, 44-46 Earls Court Road, London, W8 6EJ. It contains a compiler which turns a subset of Pascal into Basic.*

A colour printer is available for certain microcomputers but unfortunately an interface for the Spectrum to use the printer is not available yet.

Protecting software

THANK YOU for the write-up in the *Sinclair User* December issue regarding the Software Protection Unit. We also, in fact, had an advertisement in that issue concerning the same unit.

Unfortunately there was a rather damaging error in the write-up which had very serious effects. The protection unit uses only six batteries — as indicated in the instruction sheet. That gives a total battery price of £2.14 using Duracells or £1.50 using HP cells. The price you quoted was for eight batteries at £3.34 per set.

The price of the batteries is of vital significance to the success of the sales drive, as the competition uses nickel cadmium batteries.

R J Schmid,
Microbyte,
Lichfield, Staffs.

RAMTOP problem

HENRY EVANSON's question — Helpline, January 1983 — highlights a problem which the Sinclair manual does not make clear. If a program has been loaded into the Spectrum which moves RAMTOP — for example if the machine code in a program

continued on page 20





continued from page 19

is stored above RAMTOP and the space already reserved for UDG is not sufficient — then even if NEW is pressed RAMTOP is not re-set.

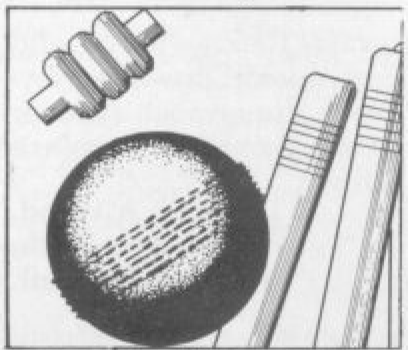
In some cases the program, though written entirely in Basic, will require the whole of the RAM — including the area reserved for UDG. If that is the case the error report 4 OUT OF MEMORY will appear after the leader has been read.

To the uninitiated that can be baffling. While all our Spectrum educational software clears sufficient memory automatically to allow the program to load and run irrespective of where RAMTOP was set, not every software house is so helpful. If, therefore, a program which is supposed to fit into your machine does not but displays error 4 you will doubtless find that clear 32767 (16K) or clear 65535 (48K) will, if entered in immediate mode before loading the offending tape, cure the problem.

Peter Forbes,
Kingfisher Software,
Loughborough.

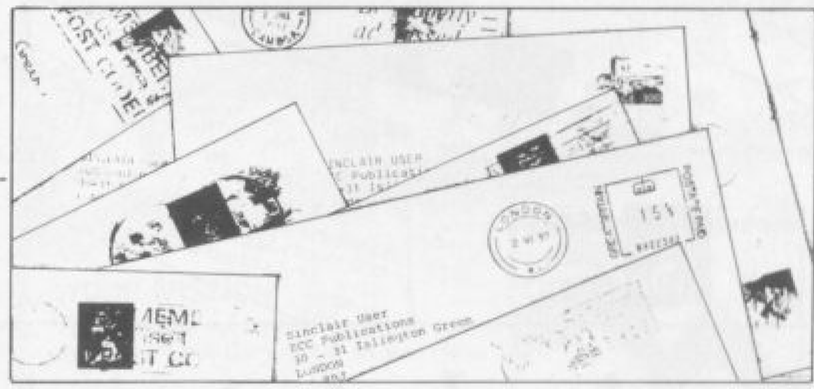
Listing is stumped

AS A KEEN cricket enthusiast, I was interested to see the program submitted by Peter Horlock. Being a newcomer to the world of microcomputing, I should like to know if that program could be modified to run on my recently-received 16K Spectrum. If so, could you publish a program for cricketing Spectrum owners, of whom there must be a great many among your readers?



Frank Kilburn,
Woodford Green,
Essex.

• *The program would be too big to run on the 16K Spectrum. If, however, any reader has written a cricket program for the machine we would be interested to see it.*



Publisher seeks sports programs

THE EDITORS of a new book to be published soon on *Microcomputers in Sport* are looking for specimen programs which demonstrate the use of computers in sport, recreation and physical education. If you have written, or are prepared to write, suitable programs and would like to submit them for publication, please send them to Dr David Brodie, School of Physical Education and Recreation, University of Liverpool, PO Box 147, Liverpool L69 3BX.

The editors are interested in both simple and complex programs, so do not consider that a straightforward program is not worth submitting. All programs selected for inclusion will have full author acknowledgment in the text and frontispiece. Many readers, young and old, experienced and inexperienced, amateur and professional, must have some programming ideas which could easily be applied or adapted to sport, recreation or physical education. Please respond quickly, as publishing deadlines have to be met, even if only to say that you are working on an idea and need a little more time to develop it.

David Brodie.

Firms receive pat on back

ONE READS constantly of complaints by the public against both hardware and software manufacturers. My son owns a Spectrum and has suffered bad service, in common with many others, but I felt I should write in praise of the following:

Campbell Systems, for keeping its word and sending goods by return.

Kempston Electronics, for rushing an order for Christmas. It could easily have written for extra money but sent the product first.

JRS Software, for redeeming me and supplying an upgrade on Christmas Eve after I had been let down elsewhere.

M D Pritchard,
Southampton.

Home computing is not harmful

RECENTLY I read with amazement the article in the December issue of *Sinclair User* by Chris Reynolds putting forward the view that children using computers will not increase their job prospects. While I would agree that the use of a micro will not enhance a child's prospects in the so-called computer industry, it will be very useful in almost any other job which requires management.



I am a sales manager and find a personal computing capacity invaluable, despite having a mainframe in the company. My programs may not be elegant but they get results in a practical situation.

Do not be misled; an introverted child is an introverted child whatever happens and no-one ever became introverted by using a computer. The real danger is of academics becoming isolated from the world of work.

R Fowle,
St Ives, Cambs.

At Memotech we realise the potential



MEMOPAK 16K For those just setting out on the road to real computing, this pack transforms the ZX81 from a toy to a powerful computer. Data storage, extended programming and complex displays become feasible.
For even greater capacity, memory packs can be added together (16+16K or 16+32K).
The MEMOPAK 32K and the MEMOPAK 64K offer large memories at economical prices.

16K: £29.90
32K: £49.95
64K: £79.00
inclusive of VAT

MEMOPAK Centronics I/F
The BASIC commands LPRINT, LLIST and COPY are used to print on any CENTRONICS type printer. All ASCII characters are generated and translation takes place automatically within the pack. Reverse capitals give lower case Additional facilities allow high resolution printing.
£39.90
incVAT

It all adds up to an efficient, modular computer system

The **Memotech** approach to microcomputing is to take the well-proven and popular ZX81 as the heart of a modular system. This small computer houses the powerful Z80A processing unit and acts as the central processor module through which the **Memopaks** operate.

Memotech has a reputation for professional quality, producing units which are designed to fit perfectly, to look well-balanced, and to work efficiently and reliably.

The modular approach gives ZX81 owners the freedom to design the system they really need. Furthermore, the intercompatibility of the modules ensures that later additions will click straight in, to give you a system that grows with your ambitions and abilities.

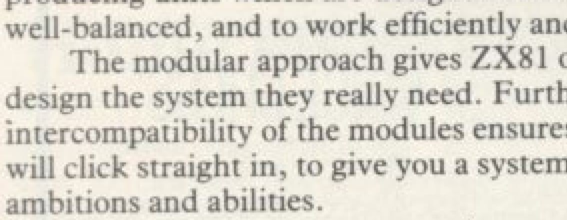
To ensure that your expectations are realised, care is taken at every stage to design features into the system to anticipate your needs. For example:
1) Memories are cumulative e.g. 16K and 32K can be added to the **Memopak 16K** or even to the Sinclair 16K RAM pack. **2**) The **HRG** firmware allows commonly used constructions (such as scrolling, shading and labelling graphs), to be called by a few simple commands. **3**) The **Centronics I/F** converts ZX81 character codes into ASCII and extends the print line to the width of the printer, still using the LLIST, LPRINT and COPY commands.

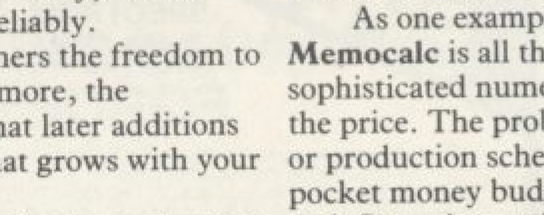
As one example, a system with 16K of memory and **Memocalc** is all that is required to perform the same sophisticated numerical projections as a computer at 10 times the price. The problem may be as complicated as a cash flow or production schedule, or as simple as household accounts or pocket money budgeting. If your bank manager wants to see a cash flow, then a single print instruction to the **Centronics I/F** will give a printout which is more than acceptable.

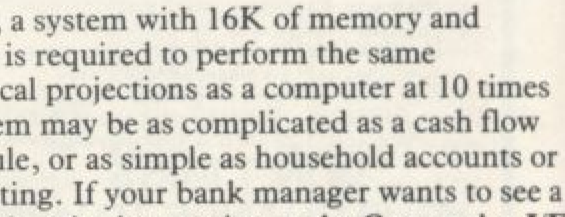
The example system which is shown, on the other hand, would satisfy the needs of someone who wanted to enter data

How it all fits together

You can see from the diagrams how various Memotech/Sinclair units can be combined.







otech, tial of your ZX81...

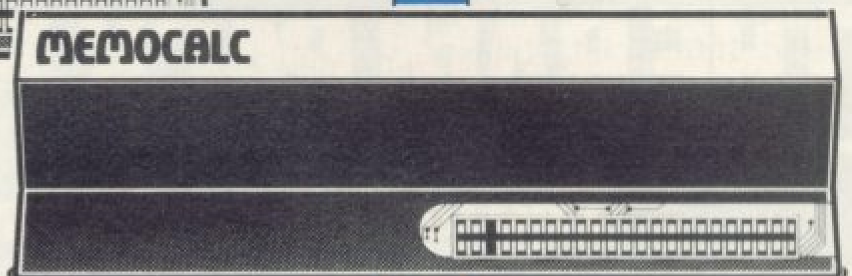


MEMOPAK HRG This pack breaks down the constraints imposed by operating at the ZX81 character level and allows high definition displays to be generated. All 248 × 192 individual pixels can be controlled using simple commands, and the built in software enables the user to work interactively at the dot, line, character, block and page levels. Scrolling, flashing and animation are all here.

£39.90 incVAT

MEMOCALC The screen display behaves as a 'window' on a large sheet of paper on which a table of numbers is laid out. The maximum size of the table is determined by the memory capacity, and with a MEMOPAK 64K a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified. Each location in the table can be either a number which is keyed in or a formula which generates a number.

£29.90 inc VAT



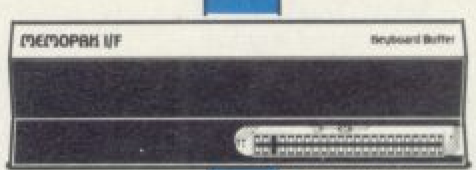


MEMOTECH KEYBOARD

The Memotech plug-in Keyboard plus buffer pack takes the effort out of data entry for ZX81 users. The Keyboard has a light professional touch and is housed in an elegant aluminium case. The simple plug-in system means that you are not obliged to open up your ZX81, use a soldering iron or invalidate your ZX81 warranty.

£49.95 inc VAT





KEYBOARD BUFFER PAK
The Buffer Pak performs a "housekeeping" function for the Keyboard, interfacing directly with the port at the back of your ZX81.

via a light-touch keyboard, construct and label graphs, and then copy the screen to an 80-column printer. Only 16K of memory is shown here but with additional memory, more than one video page can be stored. Up to 7 pages can be displayed in rapid succession to give animated displays.

Looking forward, **Memotech** will continue to back the ZX81 through 1983 with fast storage devices, pressure sensitive electronic drawing boards and more software packs including a **Wordprocessor**, an **RS232 Interface** and a **Z80 Assembler.**

MEMOTECH

To: Memotech Limited, Witney, Oxon, OX8 6BX
Tel: Witney 2977, Telex 83372 Memtec G
Please send me the following Memotech products:

Please add £2.00 per item to cover post and packing

I enclose a cheque/P.O. for ________
or please debit my Access/Barclaycard account number

Signature ______________________ Date ______

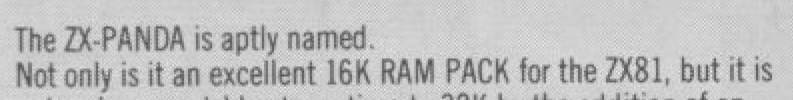
Name and Address ______________________



THE RAM PACK FOR ZX81 USERS.

The uniquely expandable ZX-Panda. Starts at 16K and expands to 32K in seconds!

The ZX-PANDA is aptly named.
Not only is it an excellent 16K RAM PACK for the ZX81, but it is uniquely expandable at any time to 32K by the addition of an expansion module!



The ZX-PANDA is contoured to fit perfectly on your ZX81. No wobble. No whiteouts!

So you can start with 16K . . . and grow bigger later!
ZX-PANDA gives you everything you need from a professionally produced RAM PACK:—

Full 16384 bytes of extra Random Access Memory.
Expandable further to 32K by simple 'plug-in' module.
Custom made case contoured to fit snugly on your ZX81.
Power-on LED.
No additional power supply needed.
Compatible with most expansion systems.
Designed and built in Britain.
Fully tested and guaranteed for 1 year.

ZX-PANDA is the RAM Pack to choose for your ZX81 expansion, because, when you want to grow bigger than 16K . . . it couldn't be simpler!

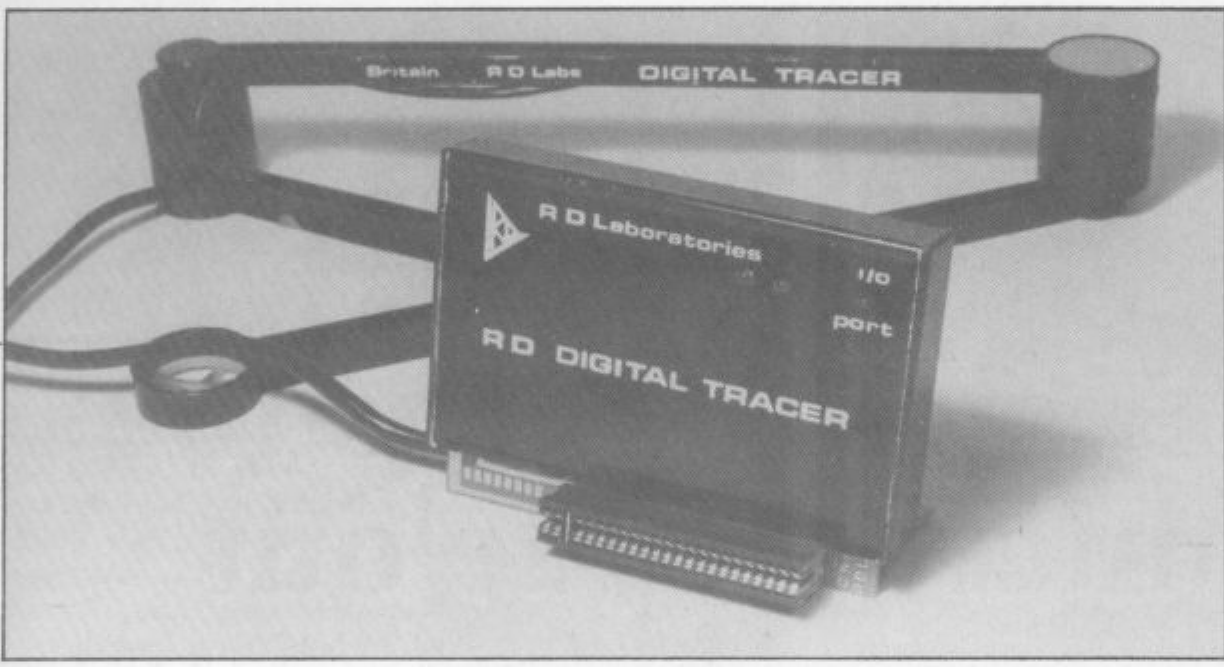


The ZX-PANDA 16K Expandable RAM Pack is available through the following retailers:

Available in the U.K. at:
Greens at Debenhams (all branches).
Wigfalls (all branches).
Artic Computing (Hull).
Data-Assette (London).
Afdec Electronics (Basingstoke).
Fox Electronics (Basingstoke).
Microware (Leicester).
RAM Electronics (Fleet).
Buffer Micro Shop (Streatham).
and other local dealers.

STONECHIP ELECTRONICS
ZX~PANDA
16K EXPANDABLE RAM.

For further information, please write to STONECHIP ELECTRONICS, The Brook Industrial Estate, Deadbrook Lane, Aldershot, Hants. Telephone: (0252) 318260.



Tracing made easier

ONE OF the most outstanding achievements in the graphics field is the RD tracer, a device which allows you to draw across a piece of paper with a cross hair — like a rifle sight — and have the computer copy the same thing on to the screen. The three-part arm needs to be fixed to the board on which you are working by the sticky strip provided — or Blu-tack. A template is provided to allow you to line up this and the graph-type map over which the arm works.

The map is marked in pixels and PRINT positions, so that letters and numbers can be added to the drawing. The interface black box, which contains an edge connector and PCB continuing strip, plugs into the expansion port of the ZX-81 or Spectrum. As it fits both computers it has only a 23-way edge connector and must therefore be used in the same way as the printer — placed after any Spectrum equipment.

On the ZX-81 it is memory-mapped into location 15391; on the 48K Spectrum it is input/output mapped (port 31), but if required on the 16K Spectrum it can also be memory-mapped via an adaptor. LEDs are provided on the module to indicate when it is being used and also if it is being used on the input/output map.

The tracer tape has ZX-81 and Spectrum programs on the same side. That is satisfactory for the Spectrum but ZX-81 owners should locate the ZX-81 program before attempting to LOAD the program.

The tracer has four programs for the Spectrum and two for the ZX-81. For the Spectrum the tracer can be used to create lines, circles or just to follow the trace of the arm in all the colours available. The drawing can them have areas "painted" in or shaded in the same or a different colour.

One thing to remember is that each character square can have only two colours. All the commands are available by one key press and the entire program is written in Basic so that it can be customised easily.

The other use of the tracer is to input data in the form of co-ordinates for graphs; they can be stored as strings and the tracing program made to execute the co-ordinates one after another, creating an automatic drawing routine.

The pictures can be saved on to tape from within the program and can also be loaded back for modification. The cost of the tracer is £55.50 with 10 per-cent discount for cash. It is available from RD Labs, 5 Kennedy Road, Dane End, Ware, Herts SG12 0LU. Tel: 0920 84380.

The drawing can be scaled to give a 3D effect, with the program taking care of the perspective. With user-definable graphics plus text and the tracer producing any other shapes, all kinds of pictures can be created.

EPROMs for Spectrums

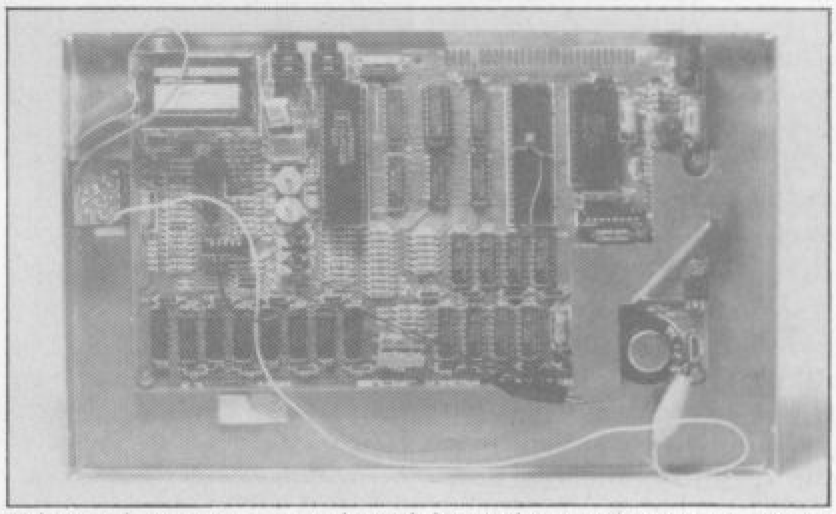
EPROM SERVICES has produced a Spectrum version of its EPROM board for the 16K Spectrum. It is in the top 8K of memory from 56K to 64K which is normally empty. It consists of four sockets on a board, to which can be added static RAMs — 6116 type — or 2K EPROMs — 2716 +5V type.

As yet there are no EPROMs available for the Spectrum but some will soon be available.

EPROM 1 contains 10 small routines for program editing such as block delete, delete up/down from a specified line, renumbering.

Only the lines, — no GOTOs or GOSUBs — and

continued on page 26



Telesound Spectrum sound modulator shown on extreme left of Spectrum board

Sound improvement

TELESOUND 84 is the latest version of the sound modulator for Spectrum, ZX-81 and the BBC computer. There is a reduction in size to ¾in. x ½in. x ½in. and the length of the leads which connect it to the computer is much-improved. The sound quality is also better and because of the connection by clips to the circuit it can be removed easily.

The Spectrum BEEP is now amplified by the TV set and is loud enough for anyone. The cost of the Telesound 84 is £9.95 from Compusound, 32 Langley Close, Redditch, Worcs B98 0ET. Tel: 0527 21438.





continued from page 25

various checks on the memory, such as program length.

The next 12 routines are for entering machine code into REM statements, in hex only, and extending and modifying both the machine code and the REM statement. There is also a very useful hex dump facility to view an area of memory which gives eight columns of hex addresses and the data in them.

Sixteen more routines contained in the same EPROM deal with the screen display and, together with a 2K RAM stored at 14K-16K on the same board, allow you to store machine code on TV screens in non-Basic RAM to be recalled later. That makes a total of 38 routines in one 2K EPROM.

EPROM II concerns tape routines, including a RAPID load and SAVE. The other routines allow you to verify and identify a Sinclair SAVEd program.

EPROM IV contains a very good ZX-81 monitor program. It requires also that the board be fitted with 2K of RAM at 14K-16K to store the monitor screen, stack and scratchpad. All the system variables are saved and the various Z-80A registers can be set before entering a machine code routine.

The Spectrum EPROM board also has the facility to be switched out of the memory map by input/output port. It has a blank 2K EPROM fitted — EPROM 1 — and costs £19. EPROMs II to IV cost £10 each and are available only for the ZX-81 at present. Eprom Services is at 3 Wedgewood Drive, Roundhay, Leeds LS8 1EF.

Basicare turns the micro inside out

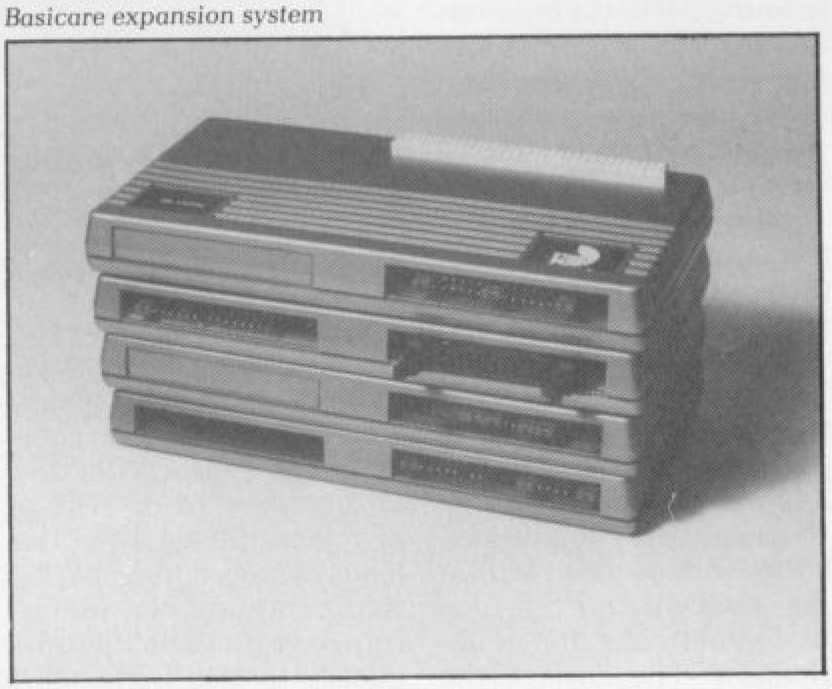
BASICARE seems to be intent on revolutionising the world of microcomputing by providing all the facilities of a computer except the CPU and the language outside the micro. The system contains RAM and can be extended to Centronics printers, character generators, battery-backed RAM, RS232 with no worry about where to fit them in the 64K of the memory map of the ZX-81.

When fully-expanded the Basicare system could have 112 peripherals, divided into SLOTs on each page of the memory map. Sixteen pages of 32K worth of dynamic memory, 512K of memory for use by Basic or machine code, four 8K areas of DATA plus four 8K areas of TOOLKIT routines — ROM/RAM or battery-backed RAM. Total memory size of the system is 576KB. Since they take up most of the expense of any system, Basicare has made them compatible with most computers by linking them via a 64-way edge connector. The computer is connected to that bus via a PERSONA module, which fits into the computer memory map. That way the modules can remain the same; it is only the position on the memory map which changes.

The basic system must consist of a computer — at present the only PERSONAs available are for the ZX-81 and the Spectrum — and the PERSONA for that computer.

Having established the system for accessing all those extra boxes, you are still limited to 64K of memory map — 8K or 16K ROM, 8K for SLOT and PATH areas, and the rest can be RAM unless you buy a MINIMAP module to switch the pages in the system. That would seem essential, otherwise there are many other cheaper systems which stay within 64K.

Basicare expansion system



Extra memory may be added in 16K or 64K dynamic portions or 2K chips of static memory. Dynamic memory can be used only in the 16K-32K and 48K-64K regions of the memory map. The RAM pack containing static chips may have a USER-FRONT option fitted to allow you a programmable character set.

The SLOT area in the memory map — 44K-48K — is used to store all the input/output devices such as Centronics printer module — Pericon c — and the two types of 24-line input/output ports available — Pericon a and b. The SLOT is also used to access the MINIMAP by POKEs to change the pages. Another 4K area, called PATH, is not specified in the documentation and presumably will act like the BBC computer TUBE interface to connect to other micros.

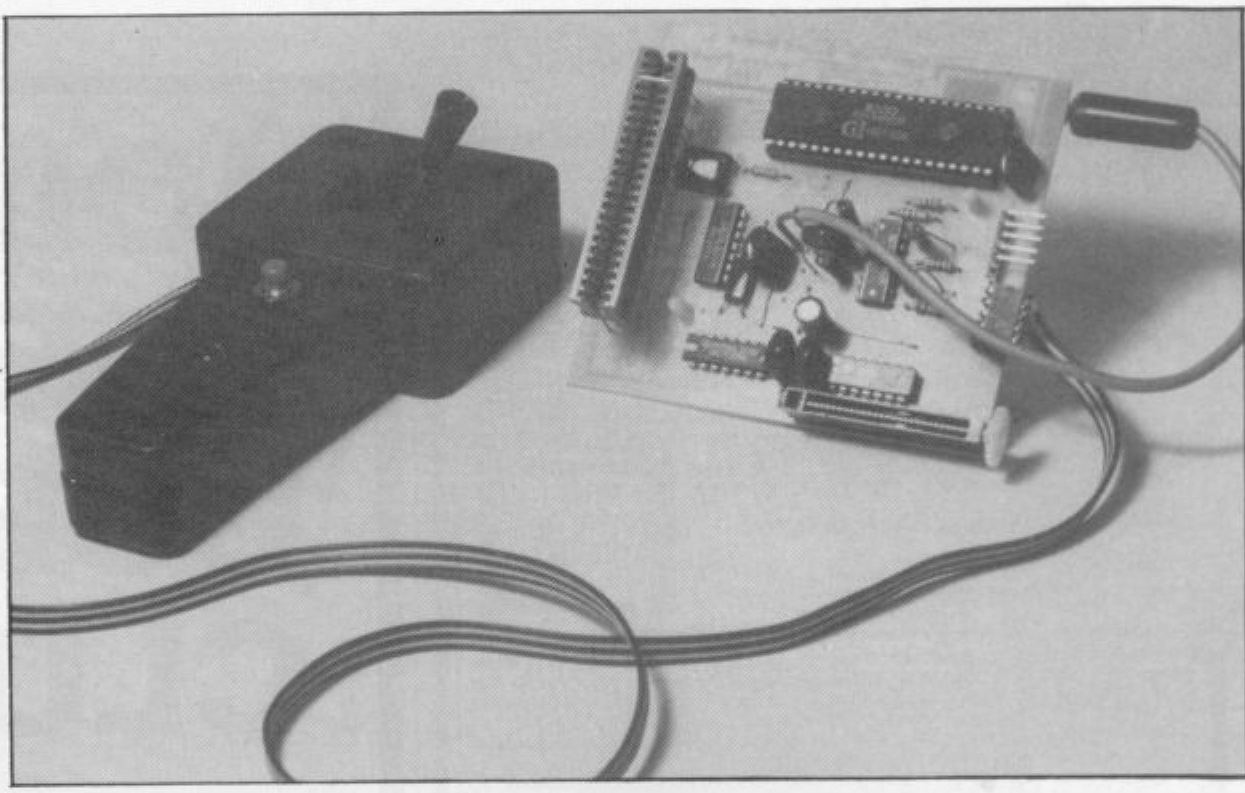
The file area — dynamic RAM — can be used to hold segments of a program like subroutines. Those subroutine pages can be called by a Basic POKE to change from one routine to another.

Basicare Microsystem Ltd is at 12 Ricketts Street, London SW6 5EL, tel: 01-385 2135.

Repeat key for ZX-81

AN AUTO KEY repeat key module is available for the ZX-81 which works in the same way as the Spectrum — 1.5 sec. delay before repeating. It is soldered on to the ZX-81 via nine wires and rests inside the case underneath the keyboard. It is not the same design as the Haven Hardware module. It works just as well as the Spectrum and provides a clean action.

TV Services of Cambridge makes the device and it is sold by that company and Kempston Electronics at £6.50 including postage. TV Services is at Chesterton Mill, Frenches Road, Cambridge CB4 3NP. Tel: 0223 358366.



The games companion

PROGRAM POWER has produced what seems to be an all-in-one module which contains joystick, soundboard and amplifier. The amplifier can also be used to boost the weak BEEP of the Spectrum up to a full two watts via the volume control. The board is not cased and fits ZX-81 or Spectrum, although the ZX-81 user will have to write some machine code to use it.

The board does not have a continuing strip at the back, so place it last.

A demonstration tape is provided with every purchase and allows you via Basic to hear a selection of pre-set sounds and to be able easily to alter the sound registers one by one. The sound chip also contains an input and output port and they are used to run the joystick.

The joystick is not the switched type, however, and gives a position back in the form of two numbers X and Y. The fire button results in setting a variable to 1 if pressed and all the joystick commands are accessed by a machine code routine for greater speed.

At present you have to put together the joystick, as it arrives only as a kit. The instructions are easy enough to follow but it requires soldering and the screws which hold the case together seem difficult to fit.

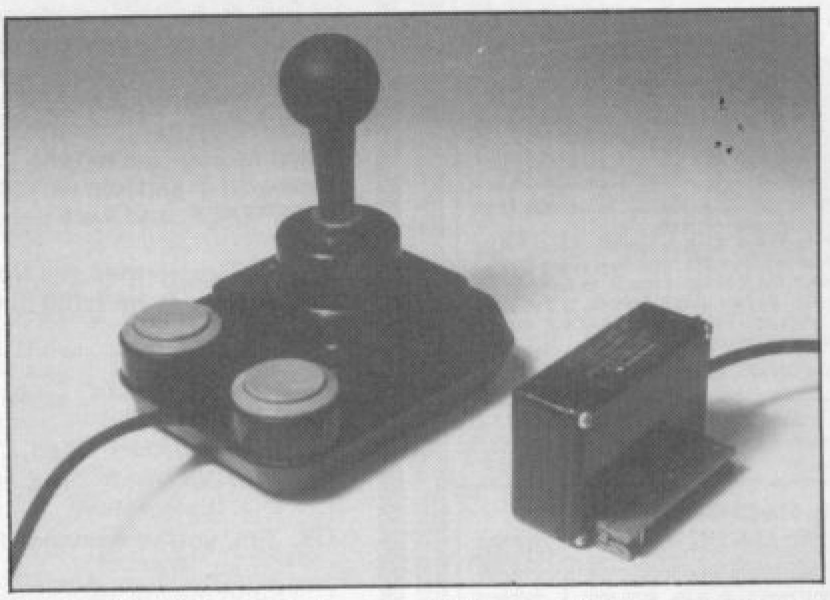
The system works very well and as it contains its own loudspeaker and is driven from the Spectrum or ZX-81 power supply, it should do very well.

Micro Power sells the sound board for £24.43 and the joystick for £6.53 inc. case or £4.55 without, all inc. VAT. Micro Power is at 8/8a Regent Street, Chapel Allerton, Leeds LS7 4PE. Tel. 0532 683186.

Joystick from Kempston

KEMPSTON (Micro) Electronics has a joystick of the switch type for the ZX-81 or Spectrum. It is a Competition-Pro joystick and is input/output-mapped by A6 being low. The joystick has a solid metal shaft and is spring-loaded with a black balled top. The two red fire buttons are about one inch in diameter and both produce the same result. The joystick can be in eight positions as the leaf springs used will both operate if moved in a diagonal direction. The joystick gives 8 for down, 4 for up, 1 for left and 2 for right. So up/right will give 6 and the joystick fire buttons both give 16.

The interface is "dead-ended", so it must go on after any other equipment, but it is attached to the joystick by 5ft. of cable, so that should not be a problem. Software is always important to an item like this and Kempston already has four programs which can use the joystick, from Abbex, Quicksilva and Softek. Gulpman has also been converted for use with the joystick. When you buy the joystick you also get the listings of three programs provided free — one Space Invaders, a hi-res drawing program and a program to mix with the Bat and Ball game provided on the Horizon tape. The joystick costs £25 inc. VAT from Kempston Electronics, 180a Bedford Road, Kempston, Bedford MK42 8BL. Tel. 0234 852997.





Word work on Spectrum



THE FIRST word processor to be produced for use with the 48K Spectrum is from Tasman Software and called Tasword. It includes most of the facilities available on larger machines, such as automatic word wrapping, left and right justification, insertion and deletion of lines and words, and cursor-controlled editing.

Text files can contain up to 900 lines and each text file can be saved independently of the program. It is also possible to merge text files if sufficient room exists within the program. The program has an example text file saved after it on the tape. That allows the user to pracise with the control key before typing-in a new text file.

The user manual has been set using the justified print of the ZX printer and is very easy to read and understand. Unfortunately that only shows the inadequacy of the Sinclair printer and the word processor package needs a dot matrix printer to demonstrate its true value.

Tasword is to be upgraded when the Microdrive and RS232 interface arrive and that will be offered to existing owners of Tasword at a reduced price.

The package is worth the money and with the additional software to follow will prove useful to anyone with reports or letters to write. Tasword costs £7.95 and is available from Tasman Software, 17 Hartley Crescent, Leeds LS6 2LL.

Get your teeth into this one

YOU MUST hunt down and destroy Count Dracula in this new adventure game, **Transylvanian Tower,** for the 48K Spectrum. There are five levels to Dracula's castle and as you move around each floor the rooms you enter are shown in 3D.



The first level of the castle is a simple maze. At any time you can call-up a floor plan with your present position and destination marked on it. When you reach the exit you can go up to the more dangerous level two.

Vampire bats swoop to attack you and you must kill them with your gun. Your shots must be accurate as you have only 10 bullets. You can also kill bats with the objects you will find scattered about the place.

On level two you can ask for a floor plan only when you kill a bat. To get through this level you need to kill plenty of bats.

Level three is the same as level two but the bats must be shot through the heart; level four is the same as level three. Level five is the most important and dangerous one. Here you must hunt the dreaded Count. Only one of the objects which you have collected from the other floors will kill him. The rest are useless but you are not told which is which.

When you have killed Dracula you are given a map on which is marked the location of his treasure. You must still tread carefully as the bats are furious with you for killing their master.

This addictive game is available from Richard Shepard Software, 22 Leys, Maidenhead, Berkshire, SL6 7EZ. It costs £6.50.

Starters get code bug

ZX BUG is a machine code monitor and disassembler for the 16K Spectrum. The program uses hexadecimal, base 16, to display numbers such as addresses and operation codes. That makes it easier to program in original code but a hex to denary, base 10, converter would have been helpful in the package.

The disassembler displays information in a series of fields, or areas, on the screen. The address of an instruction is displayed first, followed by the hex representation of operation and operand, the number to be processed by the operation. On the other side of the screen the hex is translated into mnemonic form.

The monitor part of the program will translate messages into hex and store them in memory, display register and alternative register pairs and run machine code programs.

The program is ideal for machine code beginners as it is simple to use. It is available from Artic Computing, 396 James Reckitt Avenue, Hull, HU8 0JA. It costs £6.95.

Submarine adventure

FOR ANYONE who likes playing sub-chase arcade games a new game for the 16K Spectrum, **Sub Track,** is ideal. You are the commander of a ship which sails from right to left across the screen. Lurking in the sea beneath you are submarines which release their mines trying to

continued on page 32





continued from page 31

destroy you. You have 90 seconds in which to dodge the mines and to drop your depth charges on the submarines.

The game has a definite arcade feel to it and Sub Track costs £4.95 from Amba Software, Freepost, Cambridge, CB3 7BR.

Novel database from MiCROL

A NEW TYPE of database has been produced for the 48K Spectrum by MiCROL, a company which deals in quality business software. The database is particularly interesting because it does not use a menu in the central control structure.

As a result of that it is important that the user reads the manual which is issued with the system. The manual is simple to understand and will have users storing information in the system in a matter of minutes. Unfortunately, in the beginning users may have to refer to the manual for command words, as the program has no help page. That is not a major problem and once the system has been used twice, it is easy to remember the commands.

It is possible to store several blocks of information, called documents, in one file. Each document can contain 999 lines of data. The number of lines left is displayed at the bottom of the screen if the user needs it.

It is a brave attempt at trying to change the concept of a database and we think that it has worked. It is available from MiCROL, 38 Burleigh Street, Cambridge CB1 1BR. It is excellent value at £9.95.

Colour moves on the breakout



SUPERBALL is a very colourful development of that old arcade game Breakout for the 16K Spectrum. You are given three black balls and have to break through the wall of red and yellow bricks to unlock two gates on the other side of the wall, When you have penetrated the brick defences you have to hit the ball at such an angle that it will hit the side of the game board where the small black gates are. There is one gate on either side of the board.

When you have cleared the bricks and opened the left-hand gate you earn a second ball. That means you have to keep both balls in the air at the same time. If you are able to do so you will be given a third ball which joins the other two balls to make life impossible for you. You can leave the extra balls but you should keep the black one in the air to continue playing.

Labyrinth is an 3D maze game, also for the 16K Spectrum. You must find your way around the maze and the quicker you do it the more points you score. At any time during the game you can ask for help and a map of the maze is shown, with your position and those of the entrance and exit on it.

At the end of the game you are asked if you want to see your path through the maze, again using the help map. You can also see it in fast motion if you hold down one of the keys on the keyboard.

Labyrinth, and games like it, were interesting and had amazing graphics for the ZX-81 but they are mediocre on the Spectrum.

Superball costs £4.95. and Labyrinth £4.95. They are available from Axis, 71 Brookfield Avenue, Loughborough, Leics., LE11 3LN.

Getting in odd words

SPEECH SYNTHESIS is becoming a well-researched area on the Spectrum and the Qucksilva digital speech package **Speakeasy** is a quality software device which enables a user to program a voice or music into home-made programs.



The program is loaded and a tape is made of the speech or music needed. That is then played into the Spectrum, using the load leads, while the program is in 'record' mode.

When the playback key is pressed the sounds will emerge from the Spectrum speaker or through a loudspeaker. The user may have to 'record' the sounds several times for a good-quality voice tone through the computer speaker.

When the quality is satisfactory, the sounds can be edited and specific sounds can be isolated using the start-of-sound and end-of-sound commands. The voice routines can then be put into ordinary Basic programs.

Quicksilva is at 92 Northam road, Southampton, SO2 0PB. Speakeasy costs £4.95 and L-Game £3.95.

Eddie and the Spectres

SPECTRES is a game with an original approach to the Pac-man concept for the 16K Spectrum. In this excellent game the ghosts are of the white sheet variety and the player takes the part of an electrician putting light bulbs around the haunted maze. The bulbs are lit when the electrician, Eddie, reaches one of the generators set in the corners of the maze.

The light generated in the maze weakens the ghosts and gives the electrician more time to plant light bulbs.

Spectres is available from Bug-Byte, 98-100 The Albany, Old Hall Street, Liverpool, 13 9EP. It costs £5.95.

Crystal

Innovative ZX Software

Have you the skill and reflexes to control a leviathan space freighter from lift-off to touch-down?

Have you the business head to trade successfully throughout the length and breadth of an entire planet?

Find out by becoming a

MERCHANT OF VENUS

where a complex economic scenario is combined with a superb graphic simulation to produce an entirely new concept in real time adventures.

By studying the current market and wheeling and dealing in Cyborgs, Robodrones and much more, you must plan your business strategy.

But ultimately your success depends on your ability as a pilot; from lift-off as you thrust skyward . . . during flight as you control your ship's flight over mountains, cities and oceans . . . to landing where your descent is displayed in incredible graphic detail.

A compelling game of skill and strategy for the 16K ZX-81. **£5.95**

ZX-81 1K GAMES PACK: Without doubt the finest quality collection for the **1K ZX-81:**. 4 full screen, fast action graphics games, all with on-screen scoring: Invaders, Astravoid, Bomber and Super Slalom, plus a challenging adventure, Dungeon Quest.

All 100% machine-code. Great value at £4.95

COSMIC GUERILLA: This classic arcade game is now available for the ZX Spectrum. Written in 100% machine code, with fast super-smooth colour graphics and sound. You must defend your laser bases against from incessant attack by those marauding aliens. For 16K and 48K Spectrums. **£5.95**

THE DUNGEON MASTER: Dungeons and Dragons fans . . . let the 48K Spectrum be your D.M. with the first adventure program to enter into the true spirit of D&D. Its unique dungeon creation program allows you to create your own complex scenarios quickly and simply. Comes complete with sample dungeon. Battle your way through a new dimension in fantasy. An infinity of possibilities for only **£6.95**

Open up a whole new world of programming with our professional standard machine code utilities. Send for details (including printer samples).

S.A.E. for our latest catalogue. Please add £0.50p p&p and make Cheques/ P.O.s etc, payable to:

CRYSTAL COMPUTING
2 Ashton Way, East Herrington,
SUNDERLAND SR3 3RX

Dealer enquiries welcome. Written any software? Send it to us for evaluation and details of our excellent royalties scheme.

******* SPECTRUM AND ZX81 SOFTWARE *******

CP SOFTWARE

Specialists in high quality intelligent games

***** SUPERCHESS II *****

The Best. Guaranteed able to beat Sargon II and all other Spectrum Chess programs. * 7 levels * plays a variety of openings e.g. French Defense, Sicilian, Ruy Lopez, Queen's Gambit * Self-play * Recommended moves * Hi-res display where you can select the colours * Full instructions supplied.

48K Spectrum.............. £7.95

***** ORIGINAL SUPERCHESS *****

THE CHEAPEST. With most of the features of Superchess II.

16K ZX-81 or 48K Spectrum.............. only £4.95

***** ZX DRAUGHTS *****

Did you know that a computer draughts program has beaten the world draughts champion! Draughts is an ideal game to apply tree searching techniques to. Our program analyses each position in depth, making it a formidable opponent. Choice of colour, 10 levels of play, at level 5 (response time approx. 20 seconds) it beats its own programmer!

16K ZX81 £6.95..............48K SPECTRUM £6.95

***** BACKGAMMON *****

Play this fascinating game of skill and chance. High resolution colour display, with dice roll. Can be used by expert players and also has documentation to enable beginners to learn the game.

48K SPECTRUM..............£5.95

***** SPECTRUM SPEECH *****

Yes it's possible! Software driven speech from the Spectrum. Simple to use in your own programs. Each cassette comes with user documentation and demonstration program. No extra hardware is required, uses Spectrum speaker and top 32K ram.

SOFTALK 1 "Multiwords" 70+ words (0 to 1 million, plus, add, go, limit, right etc.)

SOFTALK 2 "Spacegames" 80+ words (numbers, red, alert, damage, fire, torpedoes, bearing, south etc.)

48K SPECTRUM..............£6.95 each

***** SPECTRUM ASSEMBLER *****

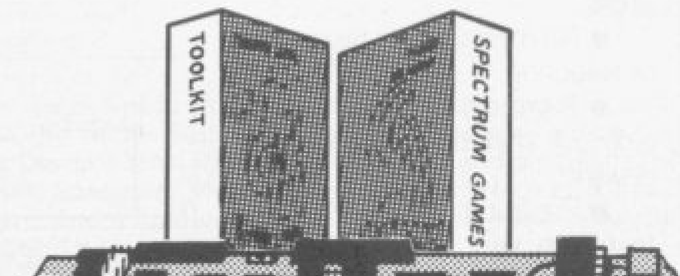
An essential aid for m/c programmers. User documentation supplied with each cassette.

16K and 48K SPECTRUM..............£4.95

All prices are inclusive. Dispatch within 48 hours of receipt of order. Send cheque or postal order (and state whether ZX 81 or SPECTRUM) to:

CP SOFTWARE, Dept. SU
17 Orchard Lane, Prestwood, Great Missenden
Bucks. HP16 0NN.

SPECTRUM BUDGET PAK



SPECTRUM 32K RAM **plus** SPECTRUM TOOLKIT and NEW SPECTRUM GAMES

SAVE £8.45!

For Issue One SPECTRUM – total package price only £44.95
For Issue Two SPECTRUM – total package price only £34.95

JRS SOFTWARE

19 WAYSIDE AVENUE, WORTHING, SUSSEX. BN13 3JU Telephone: (0903) 65691

SPECTRUM

HARDWARE

32K RAM (Issue One Spectrum) .... Only £42.50
32K RAM (Issue Two Spectrum) .... Only £32.50

SOFTWARE

Programmers Toolkit (16K & 48K) .... Only £5.95
Spectrum Games – Airport, Alien, Crabs (16K) .... Only £4.95

ZX81

A full range of software and hardware are available. Tick the coupon below for your free 1983 catalogue and enclose a large stamped addressed envelope.

I wish to order the following:

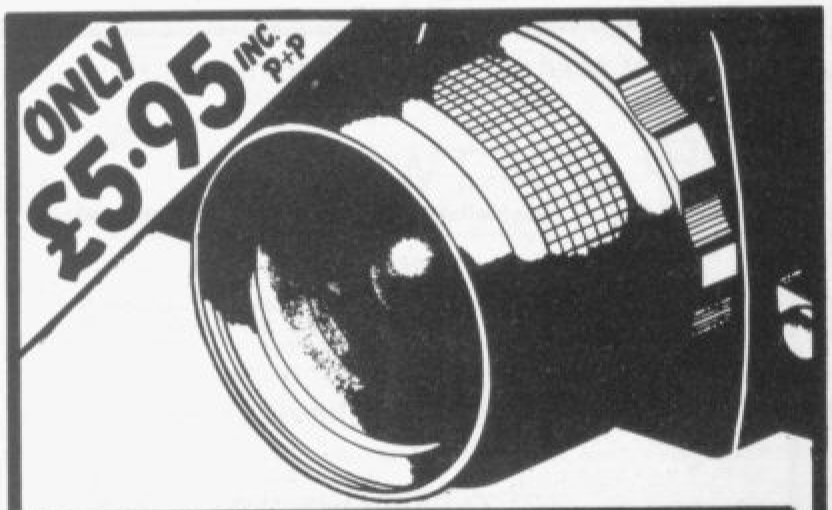
☐ Spectrum Budget Pak (For Issue One)	Only £44.95
☐ Spectrum Budget Pak (For Issue Two)	Only £34.95
☐ 32K RAM (For Issue One)	Only £42.50
☐ 32K RAM (For Issue Two)	Only £32.50
☐ Programmers Toolkit (Spectrum)	Only £5.95
☐ Spectrum Games	Only £4.95
☐ 1983 JRS Catalogue	FREE
Tick as applicable Total (Inc VAT & P&P)	

Name ....

Address ....

.... Age ....

Post to: JRS SOFTWARE, Department SU3
19 Wayside Avenue, Worthing, Sussex BN13 3JU



COMPUTERIZED PROCESS TIMER

Now you can put your ZX81 (16k) to use in your darkroom, using PROTIM, a highly sophisticated timer. Eliminate those timing errors or trying to remember what stage you are on. PROTIM gives you an on screen digital clock, with reminders of step in progress and next stage approaching. Suitable for any film or paper process. Easy to use. Full instructions supplied.

Send cheque or P.O. to:

PHOTOSOFT

32-34 Albert Street, Fleet, Hampshire, GU13 9RL.

DEALER ENQUIRIES WELCOME

GAMES FOR 16K SPECTRUM

SUPERPLAY-1 £5

by William Smith

Five different games, some of them entirely original, which should appeal to fourteen year olds of all ages!

Using a combination of BASIC and machine code — for extra zip this cassette contains the following:-

KONGO Move your man along girders and up ladders to reach the terrible kongo. Avoid the deadly patches of red jelly and watch out for kongo's patrolling warriors.

ROBOT RESCUE Guide your ship through a meteor storm to reach the landing pad and bring the stranded astronaut back to the mother ship.

HIGHWAY RUNNER Get your family of frogs safely across the M1.

BIG GAME HUNTER Shoot the advancing hordes of wild lions and rhinos.

UFO Protect your planet from the aliens with their deadly torpedoes. Be sure you don't exhaust your supply of lasers.

ALL FIVE GAMES FOR £5.

All games feature high score and on-screen score total.

SOLO-WHIST £5

by J.A. Yates

This is an excellent simulation of the well known card game and makes a fascinating change from the usual arcade type computer game.

The computer deals the cards and you play your hand against three opponents who are controlled by the computer.

A running total of tricks won is kept on the screen and you have to use considerable skill to beat the computer.

The graphics are of a high standard and you will soon forget that you are using a computer and you will become absorbed in the battle of wits with your three hard bitten opponents.

VIDEO

SOFTWARE LIMITED

STONE LANE, KINVER, STOURBRIDGE,
WEST MIDLANDS DY7 6EQ. ENGLAND
TEL: KINVER 2462 STD 038 483 2462

NOW. A ZX81 PUSH-BUTTON KEYBOARD FOR UNDER £10.



At last there's a really cheap but efficient way of ironing out the ZX81's only real bug: its keyboard. The Filesixty Buttonset offers

- A full-travel calculator-type moving keyboard for only £9.95.
- Installed in seconds. The peel-off adhesive backing means you just register into position and press.
- No messy labels, dismantling or soldering.
- 3 groups of colour keys to pick out shift, numerals and newline.
- Precision moulded in ABS to match your ZX81, with contrasting legends for maximum legibility.

Allow up to 28 days for delivery. Orders to Filesixty Ltd., FREEPOST, London W9 2BR.



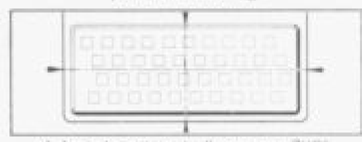
1. Make sure the original keyboard is clean and check that all the keys function.



2. The Buttonset is held in place by self-adhesive pads.



3. So all you do is remove the protective backing.



4. And place it centrally on your ZX81.

Cheques/PO made payable to Filesixty Ltd.

Please send me__________(qty.) Buttonset(s) at £9.95 each (including VAT and P&P).

Total £ BLOCK CAPITALS

Name

Address SU4

FILESIXTY

LOW PRICES ... NEW LOW PRICES ... NEW LOW PRICES ... NEW LO
EW LOW PRICES ... NEW LOW PRICES ... NEW LOW PRICES ... NEW
... NEW LOW PRICES ... NEW LOW PRICES ... NEW LOW PRICES ...



NOW! for the SPECTRUM FOOTBALL MANAGER IN 3D

COLOUR GRAPHICS

FEATURES INCLUDE.......

★ 4 DIVISIONS ★ F.A. CUP ★ PROMOTION & RELEGATION ★ TRANSFER MARKET ★ TEAM SELECTION ★ SAVE GAME FACILITY ★ LEAGUE TABLE ★ AND MUCH MORE!

ALSO AVAILABLE AT BOOKSTORES & COMPUTER SHOPS INCLUDING BUFFER MICROSHOP, LONDON & MICROWARE, LEICESTER. 3D GRAPHICS ONLY INCLUDED IN SPECTRUM VERSION

NEW LOW PRICES

~~£7.95~~ ALL PRICES FULLY INCLUSIVE

£6.95 - SPECTRUM

£5.95 - ZX81

HARDWARE REQUIRED

Spectrum 48K RAM ZX81 16K RAM

To Order send Cheque/P.O. payable to:
ADDICTIVE GAMES
at: Dept. S.U. P.O. Box 278
CONNIBURROW,
MILTON KEYNES MK14 7NE
PLEASE STATE COMPUTER

We're tired of telling you how good our game is...... let our customers tell you

Dear Sir,

I received a copy of your Football Manager, Spectrum 48K game a couple of weeks ago and felt I must just write and congratulate you on such an "addictive game".

I started on the beginners skill level with Ipswich Town in the Fourth Division. After having played six seasons I am now into the first division having won the F.A. Cup whilst in the second division. All of which took about nine hours of being glued to the screen.

Since reaching the first division I have increased my skill level and am now sixth in the table after ten seasons and about 15 hours!

The reason I am suprised that I have played this game more than any other in my library over the last two weeks, is because I don't really like watching football on television. I don't even support a team. The structure of your game is such that anyone can play it.

P. A. HACKMAN,
BURY ST. EDMUNDS

ORIGINALS CAN BE SEEN ON REQUEST



*SPECTRUM MONITOR
*SPECTRUM EDITOR/ASSEMBLER
*ZX81 SCREEN KIT 1
*ZX81 ZX-MC *ZX81 REMLOAD

FAST MAILORDER-SEND TODAY!

SPECTRUM MONITOR. Machine Code Debug/Disassembler
• Enter, Run, Debug machine code programs. • Compatible with Basic • Breakpoints and Registers Display • Disassembly to screen and/or ZX Printer • 16K and 48K versions on one cassette + 30 page manual. **£7.50**

SPECTRUM EDITOR/ASSEMBLER. A powerful and essential machine code programming aid.
16K & 48K on same cassette with full documentation. Major features include:
EDITOR with Auto Line Numbering: 40 Column screen display, tabulated into fields for easy reading: 5 character Label Names: simple Line Editing and Cursor Control: SAVE/LOAD Text Buffer to cassette: output to ZX PRINTER.
TWO-PASS ASSEMBLER accepts all Z80 mnemonics (plus many unpublished mnemonics): Decimal or Hex numbers: simple arithmetic on operands: Assembler Directives — ORG, END, DEFB, DEFW, DEFS, DEFL, EQU, DEFM.
WE CANNOT FULLY DESCRIBE THIS IMPORTANT UTILITY HERE, AND ASK YOU TO SEND A S.A.E. FOR COMPLETE DETAILS OF THIS AND ALL OUR PROGRAMS. **£8.50**

ZX81 SCREEN KIT 1. More power to your screen in all your Basic programs
BORDERS any size, anywhere on screen. SCROLL in all 4 directions. CLEAR and REVERSE PART OF SCREEN. FLASHING CURSOR anywhere on screen — simulates INPUT. DATA FILES SAVE AND LOAD Basic variables: Double Speed. 880 bytes machine code for INSTANT RESPONSE. Becomes part of Basic Program. **£5.70** 4K to 64K

ZX81 ZX-MC. Machine Code Debug/Monitor
• ENTER, RUN, DEBUG machine code programs • SAVE, LOAD, VERIFY at double speed • BREAKPOINTS and REGISTERS DISPLAY • Self contained — cannot be used with Basic • Cassette plus 36 page manual. **£7.50** 4K to 64K

ZX81 REMLOAD. Machine Code Debug/Monitor
• A version of ZX-MC without the Save/Load/Verify facility • Compatible with Basic • CREATE A REM LINE of any length • BREAKPOINTS and REGISTERS DISPLAY • Cassette plus 30 page manual. **£6.95** 16K to 64K

SEND S.A.E. NOW FOR DETAILS
6 Corkscrew Hill, West Wickham, Kent BR4 9BB.

Prices include VAT & P&P

PICTURESQUE
PICTURESQUE
PICTURESQUE
PICTURESQUE

TASWORD THE WORD PROCESSOR

48K SPECTRUM

"Very good value and great fun to use."
"Unreservedly recommended."
Popular Computing Weekly 19/8/82 – ZX81 Tasword

Now your Spectrum becomes a word processor with TASWORD. All the features of the ZX81 Tasword plus many extras. Designed to fully utilise the capacity and capabilities of your 48K Spectrum. More than 6K of machine code, a Basic program, and a manual, to give you a usable and powerful package.

Use TASWORD to produce your letters, essays, papers, records, lists, and for almost any task that requires the written word.

Whether you have serious applications or simply want to learn about word processing, TASWORD makes it easy and enjoyable.

TASWORD TUTOR
"an eloquent demonstration of Tasword's uses"
We send you a manual and a cassette. The cassette contains TASWORD and TASWORD TUTOR. This teaches you word processing using TASWORD.

£7.95 fully inclusive mail order price.

£1 DEMONSTRATION CASSETTE

See for yourself what TASWORD can do. Send just £1 for a demonstration cassette. This cassette contains the TASWORD program (with some facilities inhibited) and a text file which describes and demonstrates the performance and features of TASWORD. A voucher is included which gives you 50p off the price of Tasword.

TASMAN SOFTWARE

17 HARTLEY CRESCENT LEEDS LS6 2LL

ZX81 TASWORD

Tasword for the ZX81 (16K) is still available at £6·50. No demonstration cassette available but send 50p (refundable against your subsequent purchase of ZX81 Tasword) for a copy of the manual.

"A" LEVEL AND UNIVERSITY STUDENTS RESEARCHERS, SCIENTISTS

University Software

PRESENTS SINCLAIR ZX81 (16K)* LIBRARY OF ADVANCED MATH/STAT/ECON

Made easy to learn and use with full instructions.

TAPE 1 : MATRIX OPERATIONS £5.95
Side A : Inversion, multiplication, addition, subtraction and scalar multiplication of matrices and vectors within one single program which allows the user to complete all his operations without reloading. Inverts a 20 x 20 matrix in 6 min. 40 secs.
Side B : Determinants of square matrices.

TAPE 2 : POLYNOMIALS £5.95
Side A : Includes quadratic equations (as degree 2 polynomials) and Newton-Raphson and half-interval search methods for higher degree polynomials. Computes the roots with 8 digits of precision.
Side B : You can plot polynomials in any interval and examine their roots, extremum points.

TAPE 3 : INTEGRATION £5.95
Side A : Integration of functions by Simpson's and trapezoidal rules. Also computes the area enclosed by two functions.
Side B : Plot of integrals. Integration can be visualised on the screen.

TAPE 4 : REGRESSION £6.95
Side A : A highly developed multivariate regression program featuring up to 20 independent variables, log/ln option on each variable (thus allowing exponential, geometric and nth order regressions), standard errors, t-statistics, F-statistic, Durbin-Watson statistic, interpolation.
Side B : Plot of bivariate regressions. You can see how your computer draws a best-fitting line on a set of data points.

TAPE 5 : LINEAR PROGRAMMING £6.95
Side A : A general and efficient optimization program capable of handling any sort of linear programming problem with up to 20 variables and 20 constraints. Features the cannonical equivalent of the original problem and its dual.
Side B : Solutions of simultaneous equations with up to 30 unknowns.

- Cheques, P.O.'s payable to:

UNIVERSITY SOFTWARE
45C Sloane Street
London, SW1X 9LU

- Five tapes for £30
- All incl. prices for first class P&P
- Delivery within a week of receipt

* Available soon for Spectrum

NEW

From Warp Factor Eight

Lift-off into '83 with HI-STAK



ONLY £3·95 includes VAT, p&p

- makes your computing easier, faster, more reliable, less exhausting and simply more enjoyable.
- angles your computer neatly to the correct ergonomic position for the most efficient keyboard operation.
- provides extra ventilation for hot ZX81's and Spectrums.
- instantly applied.
- styled for '83, adds that professional look to your set up.
- precision injection moulded in quality ABS, non scratch – non slip base.

ZX81
SPECTRUM
VIC20
TRS80
NEW BRAIN
JUPITER ACE
Etc.

Order form. Please send me____HI-STAK set(s) (at £3.95 per set). I enclose cheque/P.O. for________

Name ________

Address ________

Post code ________

To: Warp Factor Eight, Dept. SU.
6 Pelham Road, Braughing, Ware, Herts. SG11 2QU.

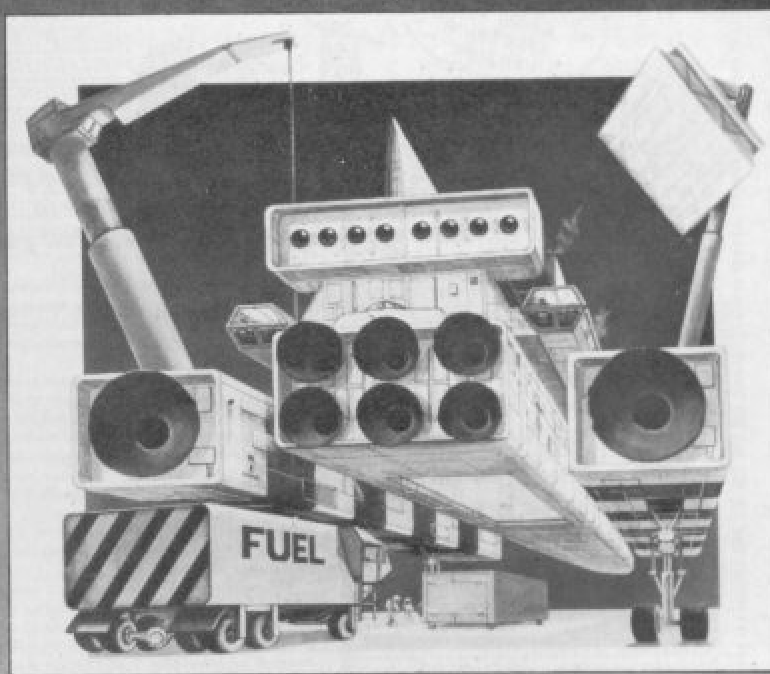
QUICKSILVA

are proud to announce they are now marketing

PIXEL GAMES

TRADER

A trilogy of 16K programmes that combine to give an epic 48K graphic adventure. As a galactic trader, you deal with some very bizarre customers indeed. Will you live to tell the tale?



SUBSPACE STRIKER
With your deadly Antimat torpedoes, you unleash havoc in the Federation spacelanes and try to dive back to the safety of subspace, fast.
+ ZOR — Battle of the robots. Fight for survival in this action-packed strategy game.

STARQUEST
With the help of your on-board computer, you seek a habitable planet amidst the perils of deep space.
+ ENCOUNTER — In this adventure, you are snatched off the Earth and the space invaders play YOU!

PIXEL POWER A graphics workshop packed with useful features like Create, Amend, Save, View Set.

HARVESTER A cut-throat strategy game for 2 to 4 players.
BRAINSTORM Can you get our three space explorers across a river of nasty goo without blowing their minds.

SUPPLIED ON CASSETTE
Send order to: QUICKSILVA, DEPT SPC, 92 NORTHAM ROAD, SOUTHAMPTON, SO2 0PB

ZX-81 GAMES			
Trader	ZX-81 + 16K RAM	£9.95	☐
Subspace Striker + Zor	ZX-81 + 16K RAM	£3.95	☐
Starquest + Encounter	ZX-81 + 16K RAM	£3.95	☐
VIC20 GAMES			
Trader	VIC20 + 16K RAM	£14.95	☐
Subspace Striker + Zor	VIC20 + 16K RAM	£7.95	☐
Starquest + Encounter	VIC20 + 16K RAM	£7.95	☐
Pixel Power	VIC20 + 16K RAM	£7.95	☐
Harvester + Brainstorm	VIC20 + 16K RAM	£7.95	☐

Please send me the games as ticked.

Total cheque/P.O. enclosed........
Cheque payable to QUICKSILVA

Name........

Address........

....

....

WHO ON EARTH COULD HAVE CONCEIVED QUICKSILVA SOFTWARE?

TIME-GATE

by J. Hollis

THE UNBELIEVABLE SPACE/TIME ADVENTURE FROM QS!

High speed graphics combined with electrifying space adventure make TIME-GATE the game of all games.

Foil the ruling aliens by travelling back through time and blasting out their home planet. Fight 3D space battles on your journey, seeking the time gates that lead to year zero and the salvation of the human race.

Features: 4D — High speed graphics — versatile scanning — status and battle computers — land & take-off from many planets — time-travel — 5 skill levels — score & rating plus free training program.

SPECTRUM 48K

NEW! TORNADO . . .

by Chartec

ONLY AVAILABLE FROM QS!

Your ship is a Tornado. A craft specially designed for use over the Red Planet able to manoeuvre fast and effectively in the thin atmosphere. Now the end of Colony Wars is in sight, a final pocket of seething hate has been located and is about to be eradicated, the last clan will shortly fall . . . If the mission is successful . . .

Features: Full Colour High Res Graphics — Sound — Scoring — Ships Attacking — 3 Types of Ground Base — 2 Player Option — Increasing Speed — High Score — Progressive Difficulty — Random Landscapes — Explosions.

VIC 20 + JOYSTICK

NEW! GALAXIAN & GLOOPS

by T. Beckwith

GALAXIAN

The battle rages on the distant planet. Only you can save the peaceful population under attack. Are you good enough?

Features: Full Attack Mode — High Score — 2 Types of Swooping Bomb Dropping Galaxian — 3 Bases — Full Scoring — Adjust Speed, Fire Rate, Number of Galaxians.

GLOOPS!

Quicksilva offer this special version of the famous pill-eater on this tape just for the hell of it!

ZX81 16K

NEW! MAGIC WINDOW

by M. Walker

Character Generator supplied on tape.

Features: Define characters on 8x8 grid — Save to Tape — Load from Tape — Hex & Dec O/Ps.

Character Manipulation: Mirror — Rotate — Invert — Left — Right — Up — Down — Hold — Wipe — Cancel.

* Redefine Whole Character Set *

Also works in Colour Mode. Excellent examples supplied.

ATARI 400/800 + JOYSTICK

NEW! MUNCHEES

by A. Laird

Outwit the Ghost in the creaking house.

Keep taking the pills — Power Pills to keep you one step ahead of a sticky end!

Features: 1-4 Ghosts — 3 Munchees — Power Pills — Side Doors — Fruit — High Score — Bonus Munchy — Increasing Speed.

ZX81 16K

NEW! MINED-OUT

by I. Andrews

Enter the minefield at your peril. However, you must save Bill the Worm at all costs. If you are very skilled you will be able to rescue the Damsels in Distress, also trapped in the minefield.

Features: 9 Levels of Play — High Score — Progressive Difficulty — Tricky Mines — Damsels in Distress — Mine Detector — Safe Area.

SPECTRUM 48K

NEW! CROAKA CRAWLA

by J. Field

Save Clint Frog from a messy fate. Watch out for the relentlessly approaching trucks that are tired of hedgehogs. Look out for the Crocodiles, they are equally Frog-Hungry!

Features: Frogs — Lorries — Logs — Turtles — Different Levels of Play — Scoring — Frog Count — Flies — Crocodiles — Sinking Turtles — Progressive Difficulty — Attack Waves.

ZX81 16K

CHESS PLAYER

by M. Wren-Hilton

Speech & Personality

SPECTRUM 48K

SPEAKEASY

by J. Hollis

Add sound or speech to your program

SPECTRUM 48K

METEOR STORM

Speech and Arcade Action

SPECTRUM 16K

SPACE INTRUDERS

Mutants and Arcade Action

SPECTRUM 16K

For the ZX81 & 16K Ram:

QS SCRAMBLE QS INVADERS
QS ASTEROIDS QS DEFENDA



TORNADO	NEW!	VIC 20	+ J/S	£5.95	☐
MAGIC WINDOW	NEW!	ATARI	400/800 + J/S	£8.95	☐
TIME-GATE		SPECTRUM	48K	£6.95*	☐
MINED-OUT	NEW!	SPECTRUM	48K	£4.95*	☐
CHESS PLAYER		SPECTRUM	48K	£6.95	☐
SPEAKEASY		SPECTRUM	48K	£4.95	☐
METEOR STORM		SPECTRUM	16K	£4.95*	☐
SPACE INVADERS		SPECTRUM	16K	£4.95*	☐
GALAXIAN & GLOOPS	NEW!	ZX81	16K	£4.95	☐
CROAKA CRAWLA	NEW!	ZX81	16K	£3.95	☐
MUNCHEES	NEW!	ZX81	16K	£3.95	☐
QS SCRAMBLE		ZX81	16K	£3.95	☐
QS INVADERS		ZX81	16K	£3.95	☐
QS ASTEROIDS		ZX81	16K	£3.95	☐
QS DEFENDA		ZX81	16K	£3.95	☐

* FREE KEYBOARD OVERLAY WITH THESE GAMES *

PLEASE SEND ME THE GAMES AS TICKED

NAME ....

ADDRESS ....

....

....

Access VISA

SEND ORDER TO:
QUICKSILVA, DEPT SU, 92 NORTHAM ROAD, SOUTHAMPTON SO2 0PB TEL: (0703) 2016

AVAILABLE FROM BOOTS, W.H. SMITHS, MENZIES AND ALL LEADING COMPUTER STORES.





Chris Reynolds' article in December on the possible dangers of microcomputing provoked a good deal of response. J R Bird argues that the conclusions are incorrect

Hooked on arrogance

COMPUTING is much more than programming. It is concerned with the flexible use and application of ideas. The ideas are structured logically by means of a language.

That is one of the reasons why many of the conclusions of Chris Reynolds in his article in the December *Sinclair User* — Code Junkies Hooked on Micros — are incorrect. Although much of what he said was valid, the tone was prejudiced and negative.

All the problems of vocational computer training were blamed on owners of the home computer. The only slight comment in favour of the powerful little machines appeared in the last paragraph but even then they were dismissed as little more than games machines.

To condemn home microcomputer owners as potential code junkies — people with an addictive perverse interest in computers — probably as failures in academic life and as unemployable is a form of professional arrogance. Most people who have an interest in computing also have other interests.

It is the same arrogance which leads many people to claim exclusive rights to comment on particular branches of knowledge, especially how those branches will develop in the future.

There are likely to be many problems associated with the future in areas such as jobs or careers, leisure and education. None of those can be answered by any one group, be they teachers, employers, lecturers or workers, claiming they have the exclusive right to comment and decision-making.

Neither should Reynolds be advocating novice students in computing. That kind of logic is rather like a professor of French insisting on novice speakers — those who do not speak yet — if he is going to produce good speakers of French.

A teacher of a foreign language must take account not only the students' own language but also their development within that language.

If a student has had experience of a computer language it is reasonable to expect lecturers to take it into account. If specific languages cause problems, the lecturer must identify the problem and work out ways of overcoming them. A lecturer should not advocate novice students; it is no solution.

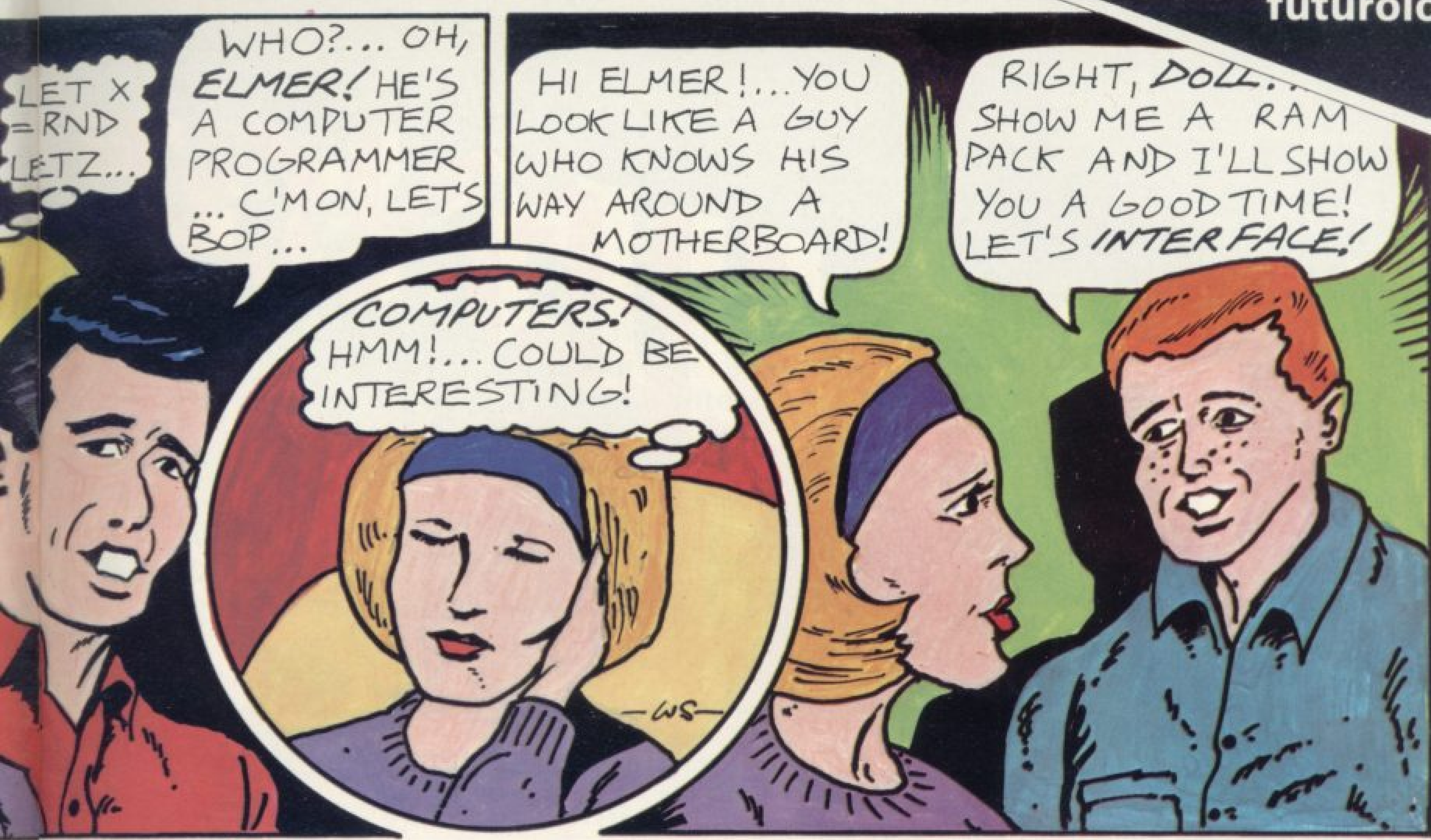
There is a clear and unfortunate rift between academics and non-academics, professionals and amateurs. Academics tend to be more concerned with protecting their access to knowledge rather than sharing it. Professionals seem to be more concerned with keeping their right to knowledge rather than sharing it with amateurs.

Computing at a high level is for a small number of highly-qualified students and to suggest that the needs of those few are best-served by denying the vast majority of home micro owners use of their leisure time activities is wrong. Academics appear to see things in one of two ways. Either they are shut in ivory towers researching and learning for pure knowledge, or are selling their ability to industry.

While I would not subscribe wholly to that view, I wish the apparent rift which contributes to it did not exist.

With the introduction of new technology, people will find vast changes in their life-style; work may never be the same again. The concept of five to 16 education being sufficient may disappear; re-training several times may become the norm. Leisure may become more widespread — leisure which will demand the use of new technology. If many of the problems of the future are to be solved, the rift between the academic and non-academic computer user has to be bridged for the benefit of both the average microcomputer owner and the academic

'To condemn micro owners as failures in academic life and as unemployable is a form of professional arrogance'



professional. Most people with home microcomputers would not suggest that their work with the computer would change the world but they would not suggest that those with computer PQX were inferior to them or that all mainframe work was necessarily superior.

The assumption common to many vocation-minded computer studies/ computer science lecturers, that their work was important simply because they train professional workers, is to misread the future. Before long, the day of the large 'brain' will be over and the day of the small, powerful computer will begin.

It is also clear that plain language or even interactive voice computers are on the way. When the man in the street can talk to a computer and ask it questions, the mystery of the languages probably will disappear. Before that day arrives, however, we have the problem of many computer languages, but it is surely not beyond the understanding of professionals in the computer field to structure courses to take that fact into account.

I notice that the Open University is to use a further form of Basic in its course Computing and Computers. I am not condemning the intellectual level of the OU course but rather regretting the introduction of yet another dialect.

Even with the limitation of the new OUSBASIC, the Open University is showing the way to other universities and polytechnics. The course has been designed to introduce beginners to skills and techniques of computing. Most micro owners would concede that their programs and computing would be improved for a better knowledge of structure and logic, not to mention better techniques.

So, in effect, what we have is a university or polytechnic department with the skills and resources to teach both the structure and techniques to improve the standard of home micro owners. Alongside that pool of skill we have a large number, perhaps some half-million at the moment, who would no doubt welcome some of that skill being taught to them.

What better way of bridging the academic, professional and non-academic amateur rift than bringing the two together?

That would create a new area of non-vocational studies for the institutes of higher education. As a spin-off, it would also retain in those institutions some of the teaching jobs which are disappearing under the present retrenchment in the higher education sector. Second, it could even earn money for the institutes involved. Mainly, the positive effect of academics getting together with people from all walks of life would inevitably broaden the outlook and experience of teaching staff.

> 'The positive effect of academics getting together with people from all walks of life would broaden the outlook of teaching staff'

Clearly there would be advantages for the students of such courses. They would learn better techniques, they would learn better ways of using computers, they would learn other computer languages, not to compete with the professionals, but to use in their private studies.

Further, those courses could be extended to include information and control technology and how it can be developed, designed and used.

The interaction between micro owners and the professionals, both at the formal teaching and informal social levels, could only benefit both. Experience from both sides could stimulate more courses and lead to a leisure time education industry.



NEW

3D

SPAWN OF EVIL

Deep into the galactic void, hosts of alien spawn go through a complex multi-stage breeding cycle. Your task is to seek out and smash the cycle to illiminate the spawn before it matures to full attack potential. This is the most spectacular 3D space game ever written for this 16k Spectrum.

3D

3D-TANX

This is a totally new and unique game. Never before have such graphics been seen on the spectrum. Pit your wits against the enemy tanx. A full feature game with fantastic 3-D balistics. This game, we believe, has no equal. Fantastic sounds and colour.

CENTIPEDE

One of the most addictive games for the spectrum. The Centipede increases in length as the Spider becomes an increasing menace. As you shoot off the segments, the Centipede splits up and moves at accelerated speed, up, down, left right. Full sound effects and colour.

METEOROIDS

The best spectrum version of this popular arcade game. Three meteor types which increase and decrease in frequency. The Meteors shatter into many fragments and the fragments even splatter! Ship-drift and decelerate, space-walk and evil alien ship. This game also contains two character sets.

FEATURES.

Most of our games have redefineable play keys so that they can be used with most makes of joy-stick. They are written in fast m/c and will run in the 16 or 48k Spectrum.

dk'tronics

23 Sussex Road, Gorleston,
Great Yarmouth, Norfolk
Tel: (0493) 602453

Access

BARCLAYCARD VISA

BLOCK LETTERS PLEASE

Name ____________________

Address ____________________

Please send me:

- SPAWN OF EVIL ☐
- 3D TANX ☐
- CENTIPEDE ☐
- CENTIPEDE ☐
- METEOROIDS ☐

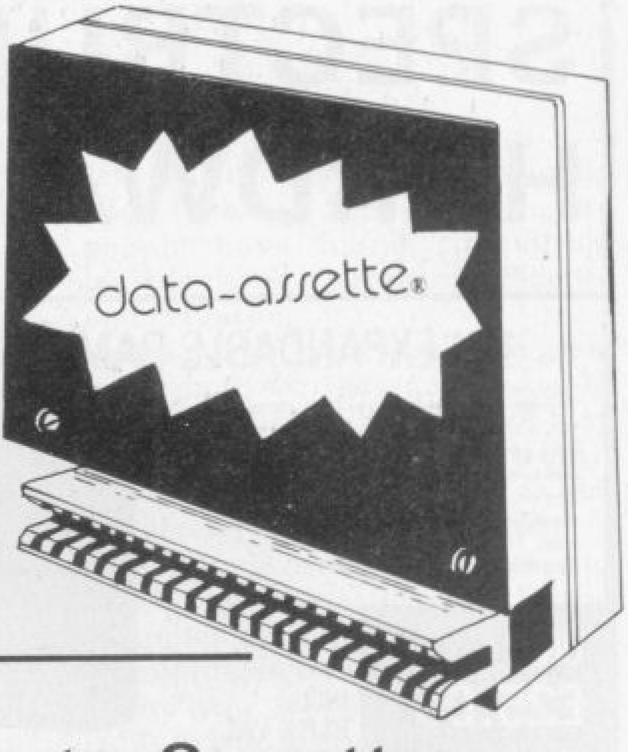
at £4.95 each

I enclose my cheque/PO payable to DK'TRONICS

Total £

NEW RELEASES

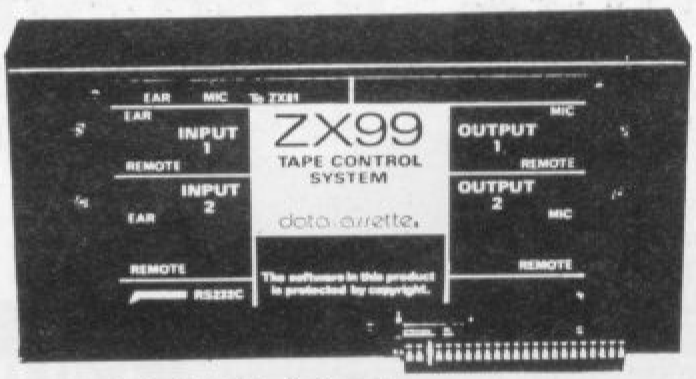
RAM PACKS



British made, high quality, add-on memory at affordable prices. Fully guaranteed.

16k Ram Pack ——— **£28·95**
16k Expandable internally by plug-in module to full 32k **£29·95**
Expansion module ——— **£17·95**

ZX99 Automatic Tape Controller for Sinclair ZX81



£49·95 plus £2·95 P&P

- ☐ DATA PROCESSING – software control of up to four tape recorders
- ☐ RS232C INTERFACE – allowing connection with any such printer using the full ASCII character code
- ☐ AUTOMATIC TAPE COPY – copy a data file regardless of your memory capacity
- ☐ TAPE BLOCK SKIP – without destroying the contents of RAM
- ☐ ZX99 SOFTWARE AVAILABLE

Contact us for details of all personal computing accessories and a full range of software including Quantec

Distributors of KAYDE products

data-assette®

44, Shroton Street
London NW1
Telephone (01)258 0409

Computer Cassettes

High quality, AGFA tape, screw assembled cassettes with library boxes

c5–37p **c10–39p** **c12–40p**
c15–41p **c20–43p** **c25–45p**
c30–46p

Cassette Leads

BBC1	7pin to 2 x 3·5mm, 1 x 2·5mm	£2
BBC2	7pin to 5pin & 1 x 2·5mm	£2·50
DRAGON	5pin to 2 x 3·5 mm, 1 x 2·5mm	£2

Cassette Workshop

E801	FIXOTAPE – Semi-automatic, frees twisted tape in seconds	**£1·99**
E612	Index cards	**50p** for **12**
ECO1	Blank white labels	**40p** for **15**
ECO2	" " on tractor paper	**£3·99** for **100**
CSS1	Revolving storage rack (holds 32 tapes or 20 in cases)	**£2·99**
CSS2	Double revolving storage rack (holds 64 tapes or 40 in cases)	**£5·99**

ORDER FORM

Dept. US2 Data-Assette
44 Shroton Street, London NW1

ITEM	NO.	PRICE	TOTAL

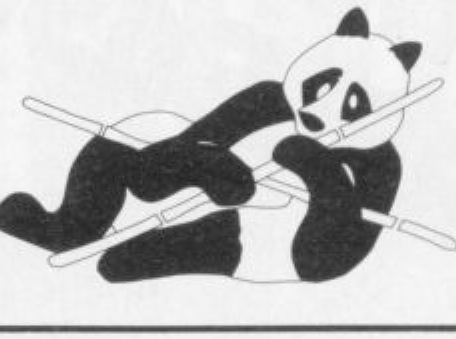
P&P 10% (min. charge £1.50)

Charge my Access/Visa no: ____________

Signed ____________ Name ____________

Address ____________

SPECTRUM ZX-81 HARDWARE



16K EXPANDABLE RAM PACK

The Famous 'Panda' Ram Pack massive 16K add-on memory. Expandable to 32K with optional plug-in module. No additional power required plug in and go. Led on/off indicator. Rugged injection moulded no-wobble design contoured case. Top quality components throughout. British designed and built.



ONLY £25.00 INCL. P&P & VAT

PANDA EXPANSION MODULE

The 16K unit is easily expandable from

16K to 32K

by simple insertion of a plug-in-module.

INCL. P&P & VAT **ONLY £20.00**

GIANT PANDA

32K UNIT

THE TWO TOGETHER

Complete at a special price of:

INCL. P&P & VAT **ONLY £40.00**

ZX KLIK - KEYBOARD

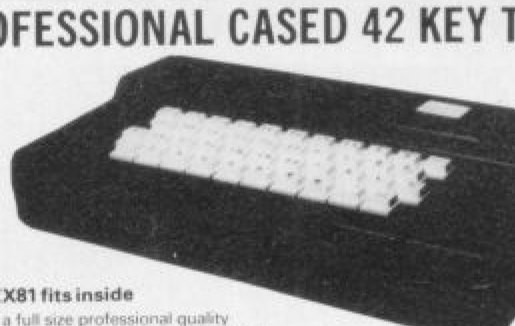


£26.50

IF, LIKE MANY ZX81 users, you are fed up with the dead feel of the touch sensitive keypad then consider the well tried 'KLIK-KEYBOARD' this is a simply fitted genuine push-button keyboard which has been designed as an exact replacement for, and is no larger than the existing keypad.

- Fits on to the ZX81.
- Full 40 keys plus one spare for any purpose.
- No soldering → JUST PLUG IN.
- No trailing wires.
- Clear permanent two colour legends.
- Positive feel and sound as data is entered.
- Speeds up programming enormously and reduces errors.
- Fitting service offered £2.00 extra (remember to send your ZX81)

PROFESSIONAL CASED 42 KEY TYPE FD 42



The ZX81 fits inside

This is a full size professional quality 42 key keyboard supplied in a tough ABS injection moulded case measuring approx 8 × 14 × 2.5 ins.
The ZX81 fits inside, with, if desired, the power supply unit.
No soldering or technical know-how is required.
The additional two keys provide extra shift and newline functions for added convenience to speed up program entry.
Led power-on indicator if needed.
Fitting service available £4.00.

INCL. P&P & VAT **£30.00**

NOW ALSO AVAILABLE FOR THE ZX SPECTRUM.

Now the famous FD42 keyboard and case unit is available for Britain's fastest selling colour computer — the amazing ZX Spectrum. It has the same high standard as the ZX81 unit and the tough moulded ABS case houses the Spectrum P.C.B. and power supply. The keyboard has 42 keys including all the Spectrum graphic characters clearly etched onto them. Full travel keys have gold plated contacts with guaranteed life of 10 operations.
Its so easy to install. You simply unscrew the ZX PCB from its case screw it into the FD case and plug in the keyboard connectors. No soldering or technical skills needed.

STOP PRESS! 16K Spectrum owners — upgrade to 48K with a Spectrum Upgrade Pack — complete with full assembly instructions.

SOUND EXPANSION

a superb addition to your ZX Spectrum!
Clear, dynamic sound effects will really enhance your enjoyment of the new, exciting progams available for the sensational ZX Spectrum. Our new sound box comes complete with leads, volume control and loudspeaker. Just plug it into your MIC input, and it fits neatly onto the back of the Spectrum in a tough, plastic case ______ JUST **£7.50**
NEW! Programmable Sound Generator – adds exciting new sounds to the Spectrum range. ______ ONLY **£20.50**

All prices are inclusive of VAT and p&p. Delivery order. All products come with a full ONE YEARS GUARANTEE.

COMING SOON!

OUR RANGE OF PRODUCTS IS CONSTANTLY UNDER DEVELOPMENT AND REVIEW. WE HAVE SELECTED PRODUCTS FROM LEADING MANUFACTURERS IN THE UK AND BELIEVE THESE REPRESENT THE BEST VALUE AND QUALITY COMBINATION ON THE MARKET TODAY.

VIC 20 ADD-ONS
SPECTRUM JOY STICK CONTROLLERS
PRODUCTS ARE STOCKED AND USUALLY DESPATCHED WITHIN 2-4 days.

Cheques/PO please to
AFDEC ELECTRONICS LTD
318 Kempshott Lane, Basingstoke, Hants RG22 5LT

PLEASE SUPPLY (all prices include VAT & P&P)

Qty	Item	Price
....	16K EXPANDABLE RAM	£25.00
....	16K EXPANSION MODULE for above	£20.00
....	32K GIANT PANDA	£40.00
....	64K THE BIG ONE	£65.00
....	KEYBOARD FD42	£30.00
....	KLIK KEYBOARD	£26.50
....	SPECTRUM KEYBOARD	£42.00
....	SPECTRUM 48K MEMORY UPGRADE PACK	£35.00
....	SPECTRUM SOUND EXPANSION UNIT	£7.50
....	SPECTRUM PROGRAMMABLE SOUND GENERATOR	£20.50

PLEASE PRINT CLEARLY

NAME ______________________

ADDRESS ______________________

____

____

Overseas customers add £4 p&p

SU3



Our easy-to-follow guide for new owners of the ZX-81 and the Spectrum

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the 48K Spectrum is big enough for simple uses in small businesses, the range of Sinclair computers does not contain machines for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your systems. It also makes life easier if you find somewhere to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy training leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is important that when using the ZX-81 it is not jolted. Some of the connections can easily work loose and everything which has been put in will be lost.

The manuals are not to everyone's liking and if you find them difficult to follow a number of books on the market can help you. Find the one which suits you best.

> 'For those with only a little knowledge the best way to approach the machines is to abandon any ideas for special uses'

As a way of relaxing you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy.

For the ZX-81 there are a few tapes for the unexpanded 1K machine but the majority require the 16K RAM pack. Similarly on the Spectrum most companies are taking advantage of the possibilities

continued on page 44





continued from page 43
provided by the larger 48K machine rather than providing cassettes for the 16K.

The tapes can vary in quality and it is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about both the ZX-81 and the Spectrum is to plunge in at the deep end and see what the machines will do. Refer to the manuals when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machines.

You may already have heard about the problem involved in SAVEing and LOADing your own cassettes. The manual gives detailed instructions but many of the early ZX-81s would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties. Usually they occur when LOADing tapes recorded by other people. One simple method to over-come this is to wind the tape to the middle of the program and type LOAD " " followed by NEWLINE; then increase the volume of the recorder slowly with the tape running until the television screen shows four or five thick black bands. If you then re-wind the tape, the program should LOAD normally.

LOADing and SAVEing on the Spectrum is much easier and faster than the ZX-81. One difference is that when SAVEing on the Spectrum the LOAD lead must be disconnected either at the recorder or the Spectrum.

Finally, a health warning. Apart from any practical uses, computing with your Sinclair machine can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning thinking that in another five minutes you will solve the problem. Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a Sinclair computer you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours with your Sinclair machine.





Step into the future:

VISIT MIDDLE EARTH WITH YOUR SPECTRUM.

Melbourne House Publishers, in association with the Tolkien Estate, are very proud to announce the release of THE HOBBIT, a super-program like no other before, for the 48K Spectrum.

THE HOBBIT is totally unique, with features never before seen on any computer, let alone on the Spectrum.

Based on the fantasy land described in J. R. R. Tolkien's brilliant novel, in this program you take on the role of Bilbo, the hobbit: danger, adventure, and excitement are all part of it, presented to you in words and graphics, but it is you who must confront and solve the problems this time.

You instruct the computer in completely ordinary English sentences!

THE HOBBIT program is capable of very sophisticated communications, including features not previously thought possible on a microcomputer: adjectives, adverbs, multiple sentences, are just a part of the power of this program.

You will meet all your favourite characters from J. R. R. Tolkien's book, and amazing as it sounds, they will all have an independent life of their own. They can make decisions and act on them! They react not only to what you do, but also to every other character in THE HOBBIT!

Because of this unique feature, you will find that each time you play THE HOBBIT, events will proceed in a slightly different way, and the further you get into Tolkien's world, the more different each visit may be.

THE HOBBIT also allows you to talk to the other characters! At last you can answer the questions they may put to you, or more importantly, you can suggest to them what you would like them to do!

THE HOBBIT program follows closely the plot of the book, and so a copy of the book is included as part of THE HOBBIT package at no extra charge.

THE HOBBIT brings to you the future of microcomputers in an exciting and challenging fantasy. A super-program that is a milestone in computer software.

Other cassette software includes PENETRATOR, a 48K state-of-the- art arcade game – £6.95 including VAT.
Spectrum books include: Over The Spectrum – £6.95.
Spectrum Machine Language – £6.95.
Understanding Your Spectrum – £7.95.

Melbourne House Publishers SU3

Orders to: 131 Trafalgar Road, Greenwich, London SE10.

Correspondence to: Glebe Cottage, Station Road, Cheddington, Leighton Buzzard, BEDS LU7 7NA.

☐ Please send me your **free** Catalogue.

Please send me:

☐ The Hobbit package – 48K Spectrum cassette, full colour instruction manual and Hobbit book – £14.95

☐ Other ....

(Please add 80p for post & pack.) I enclose cheque/money order £........ or debit my Access card No.................. Expiry date..........

Signature..........

Name ....

Address ....

....

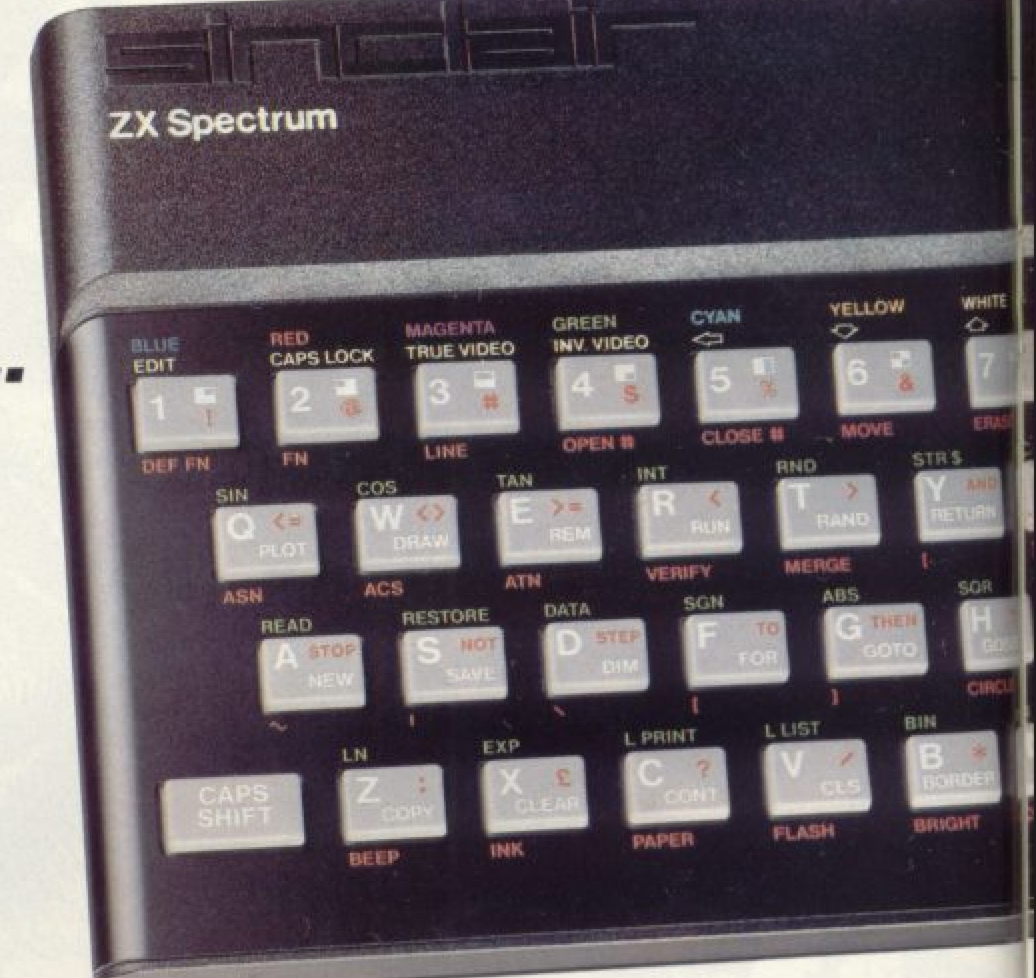
..........Postcode..........

MELBOURNE HOUSE PUBLISHERS

Sinclair ZX Spectr

16K or 48K RAM... full-size moving-key keyboard... colour and sound... high-resolution graphics...

From only £125!



First, there was the world-beating Sinclair ZX80. The first personal computer for under £100.

Then, the ZX81. With up to 16K RAM available, and the ZX Printer. Giving more power and more flexibility. Together, they've sold over 500,000 so far, to make Sinclair world leaders in personal computing. And the ZX81 remains the ideal low-cost introduction to computing.

Now there's the ZX Spectrum! With up to 48K of RAM. A full-size moving-key keyboard. Vivid colour and sound. High-resolution graphics. And a low price that's unrivalled.

Professional power–personal computer price!

The ZX Spectrum incorporates all the proven features of the ZX81. But its new 16K BASIC ROM dramatically increases your computing power.

You have access to a range of 8 colours for foreground, background and border, together with a sound generator and high-resolution graphics.

You have the facility to support separate data files.

You have a choice of storage capacities (governed by the amount of RAM). 16K of RAM (which you can uprate later to 48K of RAM) or a massive 48K of RAM.

Yet the price of the Spectrum 16K is an amazing £125! Even the popular 48K version costs only £175!

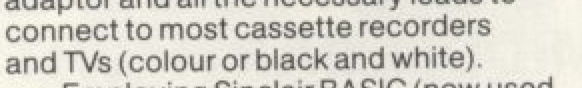
You may decide to begin with the 16K version. If so, you can still return it later for an upgrade. The cost? Around £60.

Ready to use today, easy to expand tomorrow

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing.

There's no need to stop there. The ZX Printer – available now – is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232 / network interface board.



Key features of the Sinclair ZX Spectrum

- Full colour – 8 colours each for foreground, background and border, plus flashing and brightness-intensity control.
- Sound – BEEP command with variable pitch and duration.
- Massive RAM – 16K or 48K.
- Full-size moving-key keyboard – all keys at normal typewriter pitch, with repeat facility on each key.
- High-resolution – 256 dots horizontally x 192 vertically, each individually addressable for true high-resolution graphics.
- ASCII character set – with upper- and lower-case characters.
- Teletext-compatible – user software can generate 40 characters per line or other settings.
- High speed LOAD & SAVE – 16K in 100 seconds via cassette, with VERIFY & MERGE for programs and separate data files.
- Sinclair 16K extended BASIC – incorporating unique 'one-touch' keyword entry, syntax check, and report codes.

rum



The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.



The ZX Microdrive – coming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100K bytes using a single interchangeable storage medium.

The transfer rate is 16K bytes per second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.



ZX Spectrum software on cassettes – available now

The Spectrum software library is growing every day. Subjects include games, education, and business/household management. Flight Simulation...Chess...Planetoids...History...Inventions...VU-CALC...VU-3D...Club Record Controller...there is something for everyone. And they all make full use of the Spectrum's colour, sound, and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

ZX Expansion Module

This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.

sinclair

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey GU15 3PS. Tel: Camberley (0276) 685311.

How to order your ZX Spectrum

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day. BY FREEPOST – use the no-stamp needed coupon below. You can pay by cheque, postal order, Barclaycard, Access or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option, of course. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

To: Sinclair Research, FREEPOST, Camberley, Surrey, GU15 3BR. **Order**

Qty	Item	Code	Item Price £	Total £
	Sinclair ZX Spectrum – 16K RAM version	100	125.00	
	Sinclair ZX Spectrum – 48K RAM version	101	175.00	
	Sinclair ZX Printer	27	59.95	
	Printer paper (pack of 5 rolls)	16	11.95	
	Postage and packing: orders under £100	28	2.95	
	orders over £100	29	4.95	
			Total £	

Please tick if you require a VAT receipt ☐

*I enclose a cheque/postal order payable to Sinclair Research Ltd for £ ____

*Please charge to my Access/Barclaycard/Trustcard account no.

*Please delete/complete as applicable

Signature

PLEASE PRINT

Name: Mr/Mrs/Miss

Address

SUS 903

FREEPOST – no stamp needed. **Prices apply to UK only.** **Export prices on application.**

Use your computer in the case...
Foam rubber gives complete protection...
Purpose-built for the ZX system...

ZX81 & Spectrum Custom Cases.

Just £34·95 (+P&P) each.





Turn your ZX system into a portable computing centre!

Your ZX hardware – ZX81 or Spectrum – is designed to work together as a system.

And now there's a simple way to make the most of the fact.

The portable computing centre in a briefcase.

A ZX Custom Case holds all your hardware in the most ergonomically sensible positions for easy operation. Each piece of equipment is gripped securely by shock-absorbing foam. Each connecting lead fits under the foam, so there's no chance of tangles. And as each piece is held firmly, connections are excellent.

You can forget wasted time setting up or unhooking the system, too. When you've finished, simply tuck in the mains and TV leads and replace the hinged, lift-off lid. And of course, if you're taking your ZX system to college or the office, ZX Custom Cases are a lot less cumbersome than a bag or rucksack. And a lot more protective and professional.

Designed by ZX enthusiasts – for ZX enthusiasts.

Both the ZX81 and Spectrum Custom Cases were designed by a group of ZX system users and manufactured by Britain's leading case makers. Made from impact-resistant ABS, each case holds every piece of Sinclair hardware available for the respective computers – plus Learning Lab, manual, software cassettes and any cassette player up to 10½" x 5½". If you haven't all the hardware, simply leave the pre-cut foam in position, then remove it as you get extra pieces of equipment.

And when brand new hardware is introduced, or you upgrade from ZX81 to Spectrum, simply contact us for a replacement foam insert for just £4.95 (+p&p).

ZX Spectrum Custom Case now available!



Send for your ZX Custom Case – now!

ZX81 and Spectrum Custom Cases are guaranteed for two years, and cost just £34.95 (+p&p) each. Remember you could pay more for an ordinary briefcase.

To order, simply use the FREEPOST coupon. Or if you have a credit card, telephone 0276 62155, Mon-Fri, 9.30-5.30.

COMPUTEX CASES

Computex Cases (JBS), Stanhope Road, Camberley, Surrey, GU15 3PS.

Please allow 28 days for delivery. 14-day money-back undertaking.

To: Computex Cases (JBS), FREEPOST, Camberley, Surrey, GU15 3BR.

Please send me ________ (qty) ZX81 Custom Case(s) at £36.95 (inc. £2.00 post, packing, insurance) each. **01.**

Please send me ________ (qty) Spectrum Custom Case(s) at £36.95 (inc. £2.00 post, packing, insurance) each. **02.**

*I enclose a cheque/P.O. for £________ made payable to Computex Cases.

Please debit my Access/Visa* account no. ________

*Please delete as appropriate. PLEASE PRINT.

Signature ________

Name: Mr/Mrs/Miss ________

Address ________

____

____

Reg. in England no: 991288.

SUS 303

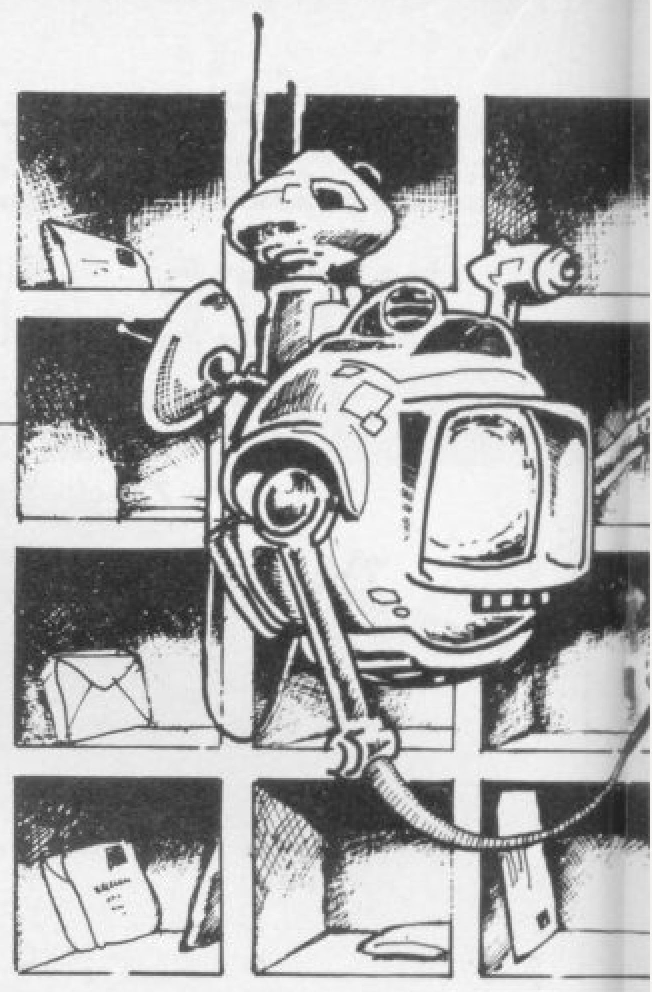
OPEN TUES-SATS 10.30 TO 5.30. CLOSED MONDAYS

OPEN TUES-SATS 10.30 TO 5.30. CLOSED MONDAYS



Simple ways of sorting data

John Gilbert provides the third instalment in his guide to learning programming



DATA STRUCTURING comprises a series of topics which most beginners like to leave alone, unless they are doing O or A level courses in computer science. The reason is that the subject can become complicated. For that reason I have decided to deal with just two areas of a vast subject.

This month I explain how to sort files of data and next month how to search through the sorted data and how best to display it on the television screen or printer.

There is only one data structure in the Basic language and that is the array. An array is a series or table of data items which are grouped under one name. They are indexed using a number. Most professional data processing programs are not written in Basic but in machine code, because of speed restrictions. Also, using data compression techniques in machine code you can enter much more data into the machine than would normally be possible.

Databases written in Basic do not often use arrays as it is better to use long strings of characters into which the data is put, or concatenated, as it is entered. In that way a user does not have to specify the length of a file or how many data items can be entered as a maximum.

Arrays occupy more memory space and their length has to be fixed before data entry but sorting and searching is easier to understand by using one- or two-dimensional arrays, as we can deal with data one element at a time.

The file creation and data entry routines of the database being constructed in this series are shown in figure one.

The listings shown are for the Spectrum but can be used for the ZX-81 with the changes mentioned in the second article. Line 100 of last month's listing has been altered slightly to contain another array, c$. That array will hold the number of the next available space in a file, the maximum number of data items it is possible to store, and the maximum length, in characters, of a data item.

In the file creation routine the user can define the file length and word length but if they are over the

Figure 1

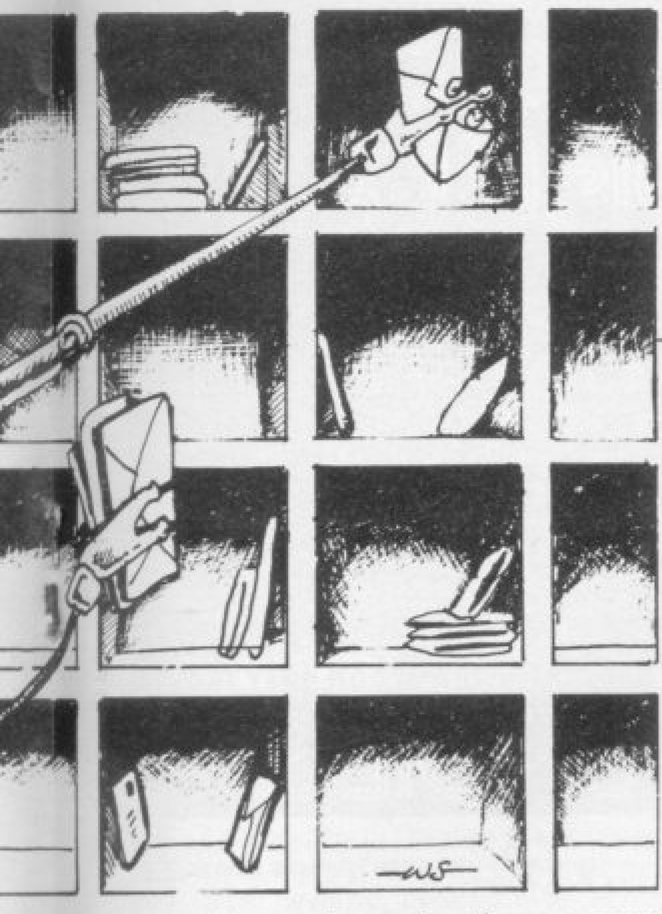
```
  10 REM ADDITIONAL POINTER ARRA
Y 'C'VARIABLE 'p' POINTS TO NEXT
 AVAILABLE   SPACE FOR DATA.
 100 DIM b$(100,20): DIM c(3): L
ET p=1
6000 REM CREATE FILE
6010 CLS : INPUT "HOW MANY DATA
ITEMS IN FILE? ";d$
6020 LET d=VAL d$
6030 CLS : INPUT "WHAT IS THE MA
XIMUM"'"LENGTH OF EACH ITEM ";e$
: LET e=VAL e$: IF e>20 THEN LET
 e=20
6040 DIM b$(d,e): LET c(2)=d: LE
T c(3)=e
6050 PRINT ''''; INVERSE 1;"NUMB
ER OF ITEMS ";d;''''" LENGTH ",e
;''"OKAY?"
6060 INPUT f$
6070 IF f$(1 TO 1)="n" THEN GO T
O 6000
6080 RETURN
7000 REM DATA ENTRY ROUTINE
7010 IF p>d THEN GO TO 7070
7020 INPUT "ENTER ITEM ";b$: IF
b$=" STOP " THEN RETURN
7030 IF LEN b$>LEN b$(p) THEN GO
 TO 7060
7040 LET b$(p)=b$: LET p=p+1
7050 GO TO l
7060 PRINT "ENTRY TOO LONG. RE-E
NTER.": GO TO 10
7070 PRINT "CURRENT FILE FULL":
GO TO l
7080 RETURN
```

Figure 2

```
8000 REM BUBBLE SORT
8010 LET p1=1: LET p2=2: LET sc=
0
8020 IF b$(p1)(1 TO 1)>b$(p2)(1
TO 1) THEN GO SUB 8090
8030 LET p1=p2: LET p2=p2+1
8040 IF sc=0 AND p2>p THEN GO TO
 8120
8050 IF p2>p THEN GO TO 8020
8060 IF sc=0 AND p2>p THEN GO TO
 90
8070 GO TO 8030
8080 LET sc=sc+1
8090 LET h$=b$(p1): LET b$(p1)=b
$(p2): LET b$(p2)=h$
8100 RETURN
8110 CLS : PRINT "SORTED": PAUSE
 200
8120 RETURN
```

Figure 3

```
8000 REM SHELL SORT.
         MODIFICATIONS TO FIGURE
 ONE.
8010 LET p1=1: LET p2=INT (p/2):
 LET sc=0
8030 IF p2>p THEN RETURN
```



maximum bounds, the computer will set them automatically to 100 and 20 respectively. The data entry routine is not yet included on the menu. It is best to put it in the menu routine at line 750 and set it to the Entry Subroutine at line 7000. The menu display at line 1030 will have to be changed so that "ENTER DATA ITEM" is displayed under "CREATE FILE".

When those alterations have been made, the enter routne at line 7000 can be added to the listing.

Figures two and three show program listings for two techniques which can be adapted for use with database. They are two of many. The study of data sorting techniques has interested academics for a long time and some sophisticated algorithms, step-by-step methods of solving problems, have evolved.

Figure two shows the Bubble or Shuttle Sort. It is fairly simple to use but very slow when dealing with large amounts of data. It is called the Bubble Sort because the data is sorted into a list in ascending order with items in the incorrect order 'bubbling' up to the top. The data items are sorted using a keyword, usually the first word of or number in the item. The Bubble Sort will take the first character in an item and compare it to the first character of the next data item.

You may like to change the routine to look at the first three or four letters of a word. The routine can take anything up to three minutes to sort 50 items of data. If you are not concerned with the time element, the routine is easy to program and use.

In the program, line 8010 defines the pointers being used in the routine. Pointer p1 will show the first item on the list and p2 the one beneath it. The variable sc will contain the number of swaps made in one pass. When that is zero at the end of a pass, the sort is concluded.

Line 8020 will send control to the swap routine if the first data item is greater than the second. Line 8030 advances the pointers and line 8040 will return to the menu if the sort is complete. Line 8070 returns control to make another pass of the data.

The swap routine starts at line 8080, and 8090 will swap the data items which are in the incorrect order. Line 8100 returns control to the main sort routine and line 8110 informs the user that the sort is complete. The routine can be improved by adding a line to make the computer display a message, such as 'SORTING', to inform the user a sort is taking place.

The Basic listing in figure two can be used as a base for the other sorting technique known as the Shell Sort and the line numbers which have been modified are shown in figure three.

The Shell Sort, shown in figures three and 4b, is slightly more complex than the Bubble Sort but will run faster with large amounts of data. If a relatively small amount of data, for instance 100 items, is to be used, the Bubble Sort will do the job just as quickly as the Shell Sort.

For the Shell Sort the data file is split approximately into two halves. The pointer p1 is, as with the Bubble Sort, set to the first data item in the file. The pointer p2 is set to the item halfway through the data file.

The item pointed to by p1 is compared to all the items in the second half of the file and swaps are made, as before, if p1 is greater than p2. When p1 has compared item one to all of the last half of the file it will point to the second item and again compare that to the second half of the file.

The sort is finished when either p1 or p2 arrives at the last item of the file and the sc swap counter variable is 0. That shows that no swaps were made in the last pass through the data and the information in the file is in the correct order.

Both structures created by the sort routines from figures two and three are illustrated in figure four. As I have said previously, they are just two of many routines and it is possible to create several other sorts using the two basic structures outlined.

Next month we will encounter a technique of searching data quickly using a Basic routine. I will also explain the best ways in which to display data on the screen, either as individual items or specific lists.

Figure 4

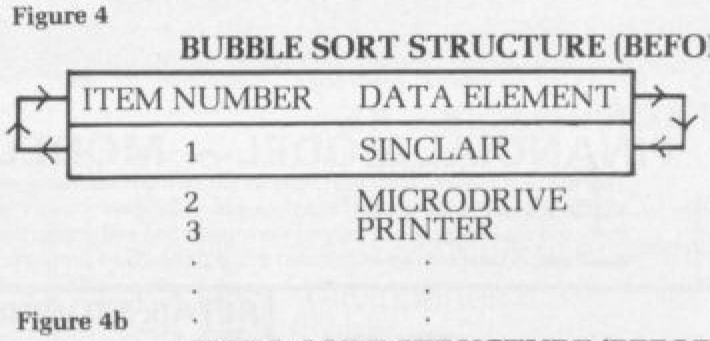
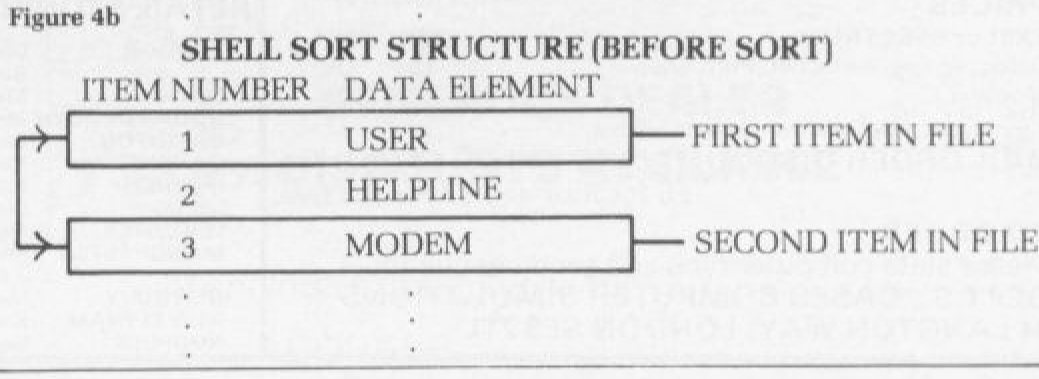
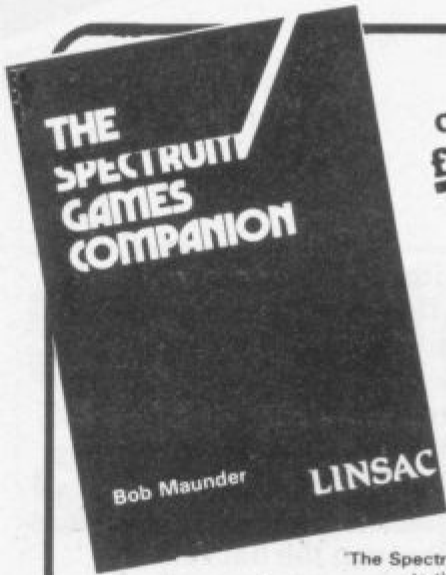


Figure 4b





ONLY
£5.95

Linsac's ZX Companion series has received excellent press reviews:

"Far and away the best" — *Your Computer*

Thoughtfully written, detailed and illustrated meaningful programs with ... outstandingly useful" — *EZUG*

'**The Spectrum Games Companion**' is the latest addition to the series and is aimed at the games player and programmer alike. Twenty-one games designed specifically for the ZX Spectrum are included, with clear instructions on entry and play. Each program is explained fully with complete details on how it is designed and written. Introductory chapters show how to set up and use the Spectrum and how to create your own games. Later sections cover number games, word games, board games, simulation games, dice games, card games and grid games. If you want to enjoy your ZX Spectrum and learn its secrets at the same time then this is the book for you!

Bob Maunder is co-author of 'The ZX80 Companion' and author of 'The ZX81 Companion'. He is a Senior Lecturer in Computer Science at Teesside Polytechnic, holds an MSc degree in Computer Science, and is a Member of the British Computer Society.

The Spectrum Games Companion is available from good book shops, or send £5.95 to:

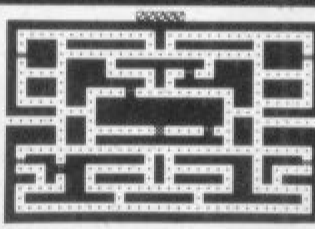
LINSAC,(SU)68 Barker Road, Middlesbrough, Cleveland TS5 5ES

Postage is free within the U.K. — add £1 for Europe or £2.50 outside Europe.

ISBN 0 907211 02 X

SF GOBBLERS

PUCKMAN FOR 16K ZX81



BEAT THAT HIGH SCORE! GOBBLE THOSE DOTS BEFORE THOSE MEANIES GOBBLE YOU! YOUR ONLY AIDES ARE FOUR "POWER PILLS" WHICH MAKE THE MEANIES EDIBLE. BUT NOT FOR LONG!

- MACHINE CODED FOR FAST ACTION
- EXTRA "GOBBLER" FOR 10,000 POINTS
- ON SCREEN SCORING
- HIGH SCORE WITH "ENTER NAME" FACILITY
- UP TO 4 PLAYERS

AN ANNOYINGLY FRUSTRATING GAME FOR ONLY £5.95

SF ASTEROIDS

FOR 16K ZX81

STAY ALIVE AS LONG AS POSSIBLE IN OPEN SPACE FILLED WITH FLYING ROCKS. SCORE BY SHOOTING THEM — WHICH ALSO CAUSES THEM TO BREAK INTO LOTS OF LITTLE BITS AND MAKES LIFE EVEN WORSE!

- MACHINE CODED FOR FAST ACTION
- ON SCREEN SCORING
- HIGH SCORE WITH 'ENTER NAME' FACILITY
- UP TO 4 PLAYERS
- EXTRA SHIP FOR 1,000 PTS (NOT AS EASY AS IT SOUNDS!)
- SHIP MOVES JUST LIKE ARCADE VERSION
- ROTATE LEFT/ROTATE RIGHT/THRUST
- FIRES IN ALL 8 DIRECTIONS
- INCREASING NUMBER OF ASTEROIDS
- THREE ASTEROID SIZES
- 'NASTY' ALIEN SPACE-SHIP (FIRES BACK!)

THIS GAME IS JUST AS BAD — AND ONLY £5.95

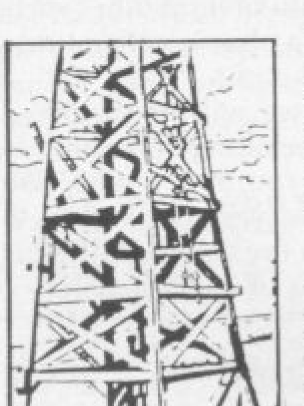
AN OFFER FOR REAL MASOCHISTS - BOTH TAPES FOR £9.95

MAIL ORDER ONLY-PLEASE MAKE CHEQUE/PO PAYABLE TO

THE SOFTWARE FARM Dept. SU
CRAIGO FARM, BOTANY BAY, TINTERN, GWENT

C.C.S. MANAGEMENT GAMES

16K ZX81 Spectrum



NEW!

DALLAS

A game of oil exploration and exploitation in Texas. Decisions are required on purchasing concessions, the movement and use of drilling rigs, and the building of platforms and pipelines. Can you take-over the Ewing Empire, or will you be taken-over in the attempt!

AUTOCHEF

As MD of a Catering Company you must negotiate for leases, decide on menu prices, level of wages, advertising and dividends. Each year you must predict the inflation rate. You will be made to resign if you are not successful. There are 3 levels of difficulty.

AIRLINE

Can you compete with British Airways? You must decide on the number of aircraft to operate, whether to buy or charter, and the levels of staffing and maintenance. Problems encountered are tax demands, strikes, cancelled flights, hijacks and aircraft crashes.

PRINT SHOP

You own a small printing company and are required to decide on (a) the number and type of staff you employ and when to increase or reduce staff (b) the amount and type of paper you stock (c) the week in which work is scheduled (d) the quotation for each. There are 3 scales of difficulty.



FINANCIAL MODEL — MODELLER X

This is a user friendly business modeller which provides Managers with a tool to plan the strategic decisions of a business. The model shows the profit sensitivity and the interaction of the pertinent marketing and production factors of a business. A user manual is included in the price of the program.

ALL PROGRAMS AVAILABLE FOR 16K ZX-81, SPECTRUM 16K AND 48K.

EXCELLENT ROYALTIES PAID FOR SINCLAIR SOFTWARE.

PRICES

ZX81 or SPECTRUM	16K	48K*
Dallas, Airline, Autochef, Print Shop	£5	£6
Modeller X	£8	£9

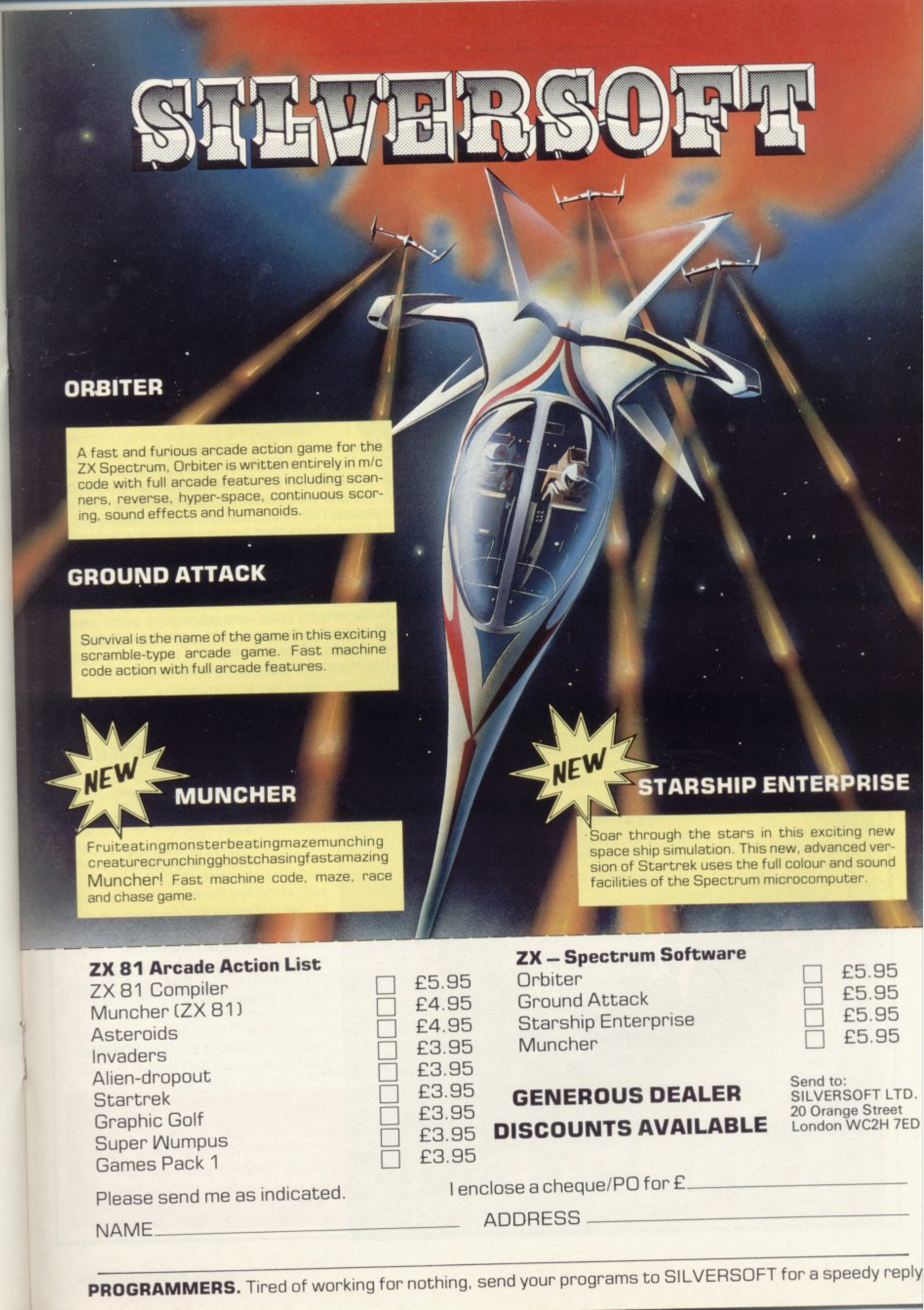
* Extended 48K Spectrum now available.

MAIL ORDER DISCOUNT £1.50 for two, £3 for three, £5 for four and £7 for the five.

TO ORDER
Please state computer type and send cheque to:-
DEPT.S., CASES COMPUTER SIMULATIONS
14 LANGTON WAY, LONDON SE3 7TL.

RETAIL STOCKISTS If you prefer to have a demonstration before buying, our stockists are as follows:

LONDON	Data-Assette, 44 Shroton Street, N.W.1.
	Buffer Micro Shop, 310 Streatham High Road, S.W.16.
BATH	Micro Style, 29 Belvedere, Lansdown Road.
BOURNEMOUTH	Zedxtra, 5 School Lane, Kinson.
BRIGHTON	Gamer, 25 Gloucester Road.
DAVENTRY	Micro Style, 67 High Street.
IPSWICH	Brainwave Micros Ltd., 24 Crown Street.
LEEDS	Dragon Byte, 51a Queen St, Morley.
LEICESTER	Microware, Unit 5, St Peters Lane.
MANCHESTER	Micro-Link, 830 Hyde Road.
	J.M. Computers, 136 Park Lane, Whitefield.
NEWBURY	Micro Style, 47 Cheap Street.
NEW ELTHAM	Kayde Home Computers, 1 Station Approach.
NORFOLK	Kayde Electronics Ltd., The Conge, Gt. Yarmouth.


SILVERSOFT
ORBITER
A fast and furious arcade action game for the ZX Spectrum, Orbiter is written entirely in m/c code with full arcade features including scanners, reverse, hyper-space, continuous scoring, sound effects and humanoids.
GROUND ATTACK
Survival is the name of the game in this exciting scramble-type arcade game. Fast machine code action with full arcade features.
NEW
MUNCHER
Fruiteatingmonsterbeatingmazemunching creaturecrunchingghostchasingfastamazing Muncher! Fast machine code, maze, race and chase game.
NEW
STARSHIP ENTERPRISE
Soar through the stars in this exciting new space ship simulation. This new, advanced version of Startrek uses the full colour and sound facilities of the Spectrum microcomputer.
ZX 81 Arcade Action List
ZX 81 Compiler £5.95
Muncher (ZX 81) £4.95
Asteroids £4.95
Invaders £3.95
Alien-dropout £3.95
Startrek £3.95
Graphic Golf £3.95
Super Wumpus £3.95
Games Pack 1 £3.95
ZX – Spectrum Software
Orbiter £5.95
Ground Attack £5.95
Starship Enterprise £5.95
Muncher £5.95
GENEROUS DEALER DISCOUNTS AVAILABLE
Send to: SILVERSOFT LTD. 20 Orange Street London WC2H 7ED
Please send me as indicated.
I enclose a cheque/PO for £
NAME
ADDRESS
PROGRAMMERS. Tired of working for nothing, send your programs to SILVERSOFT for a speedy reply





Eric Deeson considers how the micros in schools scheme is working

Schools fighting for the right to choose

A FEW DAYS ago I received a letter from the head of a primary school — pupil age five to 11 — in the West Country. Knowing my interest in educational computing, he asked if, while claiming to be even-handed, it was right for his local education authority to push only the BBC microcomputer.

He was referring to the scheme by which Government assistance is provided for primary schools to obtain and start to use microcomputers. His concern arises from the fact that his school has been using a micro for months and would prefer the Government to help the purchase of a second of the same kind.

I will bet you are thinking the school uses a Sinclair but the head swears by the Dragon. He does so, while admitting its disadvantages, for good enough reasons. Should he be frustrated in his hopes?

In the case of that school, one's answer is fairly straightforward. It is that the Government, while wishing to support the infant, but very good, British microcomputer industry, cannot be indiscriminate.

In setting-up its scheme to subsidise micros in primary schools, the Department of Industry decided to subsidise purchases of the ZX Spectrum (48K), the BBC micro (Model B), and the Research Machines 480-Z. Perhaps the Dragon would have been on the list if it had arrived a few months earlier; perhaps other, even newer, British machines would have been eligible if they had been available.

Having supported the Government so far, I must now diverge. As I implied in the January issue of *Sinclair User*, teachers are concerned that the Spectrum is not, in practice, having a fair deal. To support that concern there are far more letters than that one on the Dragon. The Dragon man's letter, however, sets out the problem.

I have heard similar complaints from hundreds of primary heads and teachers in the last few months. In almost all instances, they want their schools to have a Spectrum but their authorities are restricting purchases to BBC machines or, in a very few cases, 480-Zs.

When Mrs Thatcher launched the scheme last July, she said "schools and authorities can choose from three packages of equipment." There is growing concern that too often the authorities are choosing on behalf of the schools, without consulting the schools, and without considering the implications.

If a school wants a Sinclair rather than a 480-Z, or a BBC rather than a Sinclair, why not? I put that point to a spokesman at the Department of Industry. No, it is not the Department of Education and Science which is administering the scheme. He replied that the scheme could not have been run without the local education authorities, principally because it was hoped that they would provide teacher training courses to support the scheme.

If that is a valid reason for restricting choice, then teachers are justified in questioning the ability of local education authorities to do the job.

As a user of Spectrum, BBC and RML machines, I see no reason why a school would prefer either of the latter. That was my second point to the DoI spokesman. He said he believed that all three machines offer a robust and flexible package in a reasonable price range. "Each package has different strengths and weaknesses and was selected to

continued on page 56









continued from page 55

offer schools and local education authorities a reasonable area of choice, to enable them to select the package most appropriate to their particular needs."

He did not answer my point, did he? In what ways are BBC and RML micros better than Spectrum? I have heard of no primary teacher, no primary head teacher, and no computing adviser who does not think the Spectrum package to be best, so why has it been blocked so widely?

As a taxpayer, I am worried that Government money is being spent unnecessarily to support costly equipment which is neither preferred to, nor better than, the cheap equipment available.

"*Aux armes, citoyens*" was the call to the masses in the French Revolution. Being a pacific person, I do not cry for blood in the gutter, but I ask you to consider contacting your local education authority, asking its policy on equipping primary schools under the scheme, and querying that policy if you do not agree with it.

Two years ago a similar scheme was started for secondary school computing. The machines then were the 380-Z — forerunner to the primary school machine — and the then non-existent BBC micro. Two commonly-made comments are worth quoting.

"Most machines ordered under the scheme were 380-Zs, because, at three times the price, the community gets three times the Government subsidy."

"If it were not for the scheme and that bias towards the company, RML would be out of business by now."

You would like a new car for a 17-year-old. The Government will pay half the price of either a new Mini or a new Rover if you pay the rest. Which do you choose? Which should you choose? Would Rovers still be made if they were not such status-worthy company cars?

Alas, what happened at secondary level — unthinking waste of our valuable money — threatens with the primary scheme. What will you do about it?

'Contact your education authority, ask its policy on equipping primary schools, query that policy if you do not agree'

My campaign is not that primary schools should be compelled to buy Spectrums. It is that they should not be forced to buy any particular one; they should be allowed to choose, as indeed those who set up the scheme probably expected.

I believe that of the three machines in the list, the Spectrum is the one to choose. Here are my reasons. I look forward to someone in the BBC or RML camps to provide meaningful responses.

The Spectrum package is the cheapest. That means that schools wishing to expand a system later will find it less difficult if they start with Spectrums.

The Spectrum is easiest for young children and novice teachers to use. Smallest, lightest package; best with cassette transfer; quickly-learned keyboard for user; single-key keywords plus error-checking for programmer. Look at the BBC and 480-Z manuals if you need proof. Pretend you are new to computing; you will learn little from them.

The Spectrum is the best-developed in the open market. With its huge sales and longest time available, its bugs are few.

The Spectrum is the best-supported by its manufacturer. If you find that difficult to believe after your tussles with Cambridge and Camberley, try to communicate with Acorn or RML.

The Spectrum is the best-supported by other suppliers. The Microscene *Guide to Spectrum Resources*, including supplement, describes hundreds of products from almost 200 sources. It is most unlikely that BBC support will ever approach such a figure and it is certain that there will never be anything like it for the RML machines while, of course, Spectrum back-up grows daily.

The Spectrum package includes a printer. Few primary schools will ever be able to afford a printer to go with the other machines. I could continue, but that is not a bad start to a challenge. I mention disc units, guarantee periods and direction of likely price changes in 1983 but the case should be clear.

One of the main reasons given for having computers in schools is that children can then find what those machines, so important now and in their future, are like. The computers which primary children meet in people's homes, and will meet in their employment, are much closer to the Spectrum than to the other two contestants. No wonder education has such an out-of-touch reputation.

Consider revolting then, at least to the extent of questioning your council. I would like to know what happens. What will happen within the year is that the Spectrum will follow the ZX-81 to become education's most popular machine. Others will languish in cupboards under school stairs.

• *Eric Deeson is organiser of the Educational ZX Users' Group, one of whose functions is to develop ZX software for learning at school or at home. Send him two second-class stamps or two international reply coupons for details, including software list, to Highgate School Birmingham 12.*

The 90-page Microscene Guide to Spectrum Resources *mentioned costs £2.50 — overseas £3 — including supplement; if you have read this far, you deserve a special price of 50 pence off from 6 Battenhall Road, Birmingham 17.*

ZX SPECTRUM & ZX81 EDUCATIONAL SOFTWARE

Spectrum Junior Education £5.50

Use your Spectrum to help your children with their school work. This cassette contains eight attractive, easy-to-use programs for the 7 to 11 age group.

* Topics include English comprehension, spellings, homophones, junior science, maths and history.
* Entering your own questions and answers allows you to adapt two of these programs for exercises in any subject area.
* Moving colour graphics and sound are extensively used to improve motivation.
* Use the "draw" programm to produce pictures, maps and diagrams.

Suitable for the 16K or 48K Spectrum. Program notes are supplied.

O-Level Chemistry (C1) £5.50

This cassette contains four clearly presented revision/tutorial programs. The subject matter has been carefully structured to cover the most important aspects of:

* Elements, compounds and mixtures.
* Structure, bonding and properties.
* Redox, electrolysis and the activity series.
* Acids, bases and salts.

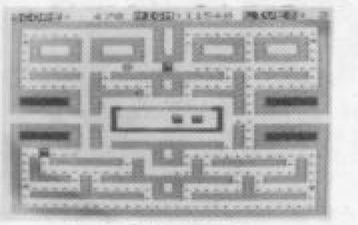
48K Spectrum and 16K ZX81 versions of the cassette are available. Please specify which you require.

Professional Computer Assisted Learning materials from:

CALPAC COMPUTER SOFTWARE
108 Hermitage Woods Crescent, St Johns, Woking, Surrey GU21 1UF.

Overseas orders: £6.50 ($11.60) per cassette; includes AIRMAIL postage.

SPECTRUM 16/48K — ZX81 16K

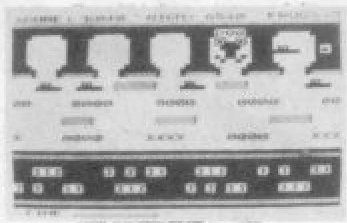


ZUCKMAN ZX81 (16K)

EAT THE DOTS, BEAT THE GHOSTS IN THIS ADDICTIVE GAME. CLEAR THE SCREEN OF DOTS TO EARN A BONUS LIFE AND A FRESH MAZE-FULL OF DOTS. WHEN THE CHASE REVERSES, CATCH A GHOST AND SEE ITS 'EYES' RETURN TO BOX.

* ALL MACHINE CODE (10K)
* AUTHENTIC ARCADE ACTION
* HIGH-SCORE 'HALL OF FAME'
* TITLE/DISPLAY ATTRACT MODE

ONLY £5.95 INC P&P



FROGGER ZX81 (16K)

GUIDE YOUR FROG ACROSS THE ROAD, THEN CROSS THE RIVER BY JUMPING ONTO TURTLES AND LOGS, TO REACH SAFETY IN A FROG-HOME. FILL ALL FIVE FROG-HOMES TO EARN A NEW 'SCREEN' WITH MORE HAZARDS.

* MOVING CARS, LOGS, TURTLES
* ALLIGATORS, DIVING TURTLES
* SAVE BABY FROG FOR BONUS
* ALL MACHINE CODE (13.5K)

ONLY £5.95 INC P&P

SPECTRUM 16/48K VERSIONS AVAILABLE SAME PRICE*
(NB: Photographs show ZX81 versions)

DJL SOFTWARE

9 TWEED CLOSE, SWINDON, WILTS SN2 3PU
TRADE ENQUIRIES WELCOME

NEW SPECTRUM AND ZX81 SOFTWARE

"WINGED AVENGER"

Fast and furious. SPECTRUM version has SOUND and USER GRAPHICS. 7 LEVELS, 3 WAVES, MOTHER SHIP, HIGH SCORE, RE-FUELLING, RAPID FIRE, SMART BOMBS and LASER SHIELD. PCW "ONE OF THE BEST SINCLAIR GAMES YET". Only £4.50. All SPECTRUM + 16K ZX81.

"SPECTRUM SCRAMBLE"

MORE M/CODE ARCADE ACTION. "SO GOOD THE REVIEWERS DIDN'T REACH THE FINAL STAGE" (NOT BAD EH!!). NO LESS THAN 8 DIRECTIONAL KEYS for a SMOOTH MOVE. Full ARCADE features including, LASERS, BOMBS, INSTANT RESPONSE, CONTINUOUS SCORING, ROCKETS, SOUND, FUEL DUMPS, RED METEORS, DEFENDER CRAFT and HIGH SCORE. Beware CONDITION RED. With this one you MOVE, FIRE and BOMB AT THE SAME TIME. RELEASE PRICE of £4.95. 16K or 48K SPECTRUM.

"DO NOT PASS GO"
NOW THE 48K SPECTRUM VERSION IS READY

A COMPLETE SIMULATION of the BEST SELLING BOARD GAME, you know PARK LANE and all that. Up to SIX PLAYERS can compete with the MICRO doing all the WORK. Acts as DICE THROWER, BOARD, RENT COLLECTOR, UMPIRE, BANK, RULE BOOK, ACCOUNTANT and PROPERTY RECORD. SUPER GRAPHICS by Gary Kennedy (thanks mate). GAME SAVE with winner so far report. COMPLETE with INSTRUCTION BOOKLET. The ULTIMATE in FAMILY GAMES. Don't MONOPOLISE YOUR MICRO. AMAZE all your friends and family. (Can you see your GRANNY on a MICRO?) ONLY £6.95. 16K ZX81 VERSION ALSO £6.95.

"BASE INVADERS"

The ONLY ARCADE GAME EVERYBODY SHOULD HAVE. The SCREEN'S the same, THE INVADERS are the same, BUT you get a SHIELD and a CHOICE of THREE SPEEDS, (O.K., FAST or INCREDIBLE). GOOD SOUND, a HARD GAME, and GREAT GRAPHICS. COMPLETE your software collection for just £4.50. 16K and 48K SPECTRUM only.

"AUDIO SONICS"

WINNER of WIZZ KID 82. For the SPECTRUM. A.S. writes sound effects for your own programs. 26 PRE-SELECTED SOUND EFFECTS include TELEPHONE, POLICE SIREN, FROG, SPACE EFFECTS and OUTBOARD MOTOR. GO into MODIFY and you are presented with a display of SLIDER CONTROLS to adjust PITCH, RISE, FALL, BRISKNESS, DECEL, ACCELL, TONE, REPEAT RATE, STUTTER and DELAY. ADJUST the SLIDERS then INSTANTLY hear the SOUND CREATED. Call "THE SOUND ONE" and a program line will appear that is ready for insertion into your own programs. Hours of EXPLORATION. YOU WILL BE AMAZED what BEEP can DO. We are proud to offer this at £4.99. 16K or 48K SPECTRUM.

"SPECTRUM RENUMBER DELETE"

All M/CODE RENUMBERS ALL NOT PART. "YOU WON'T BUY A BETTER RENUMBER PROGRAM FOR THE SPECTRUM" JUST 600 BYTES. At £4.95. ALSO ZX81 VERSION.

"HIGH NOON"

When YOU'VE SAVED the GALAXY, SCRAMBLED or whatever else you do on your MICRO, what about a GUNFIGHT? Play the SPECTRUM or YOUR PALS. THREE LEVELS. FULL FEATURES, CACTI, COFFINS, WAGONS, RAPID or SINGLE SHOTS. SUPERB GRAPHICS. GOOD SOUND including DEATH MARCH. ESCAPISM on TAPE for JUST £4.50.

"DISPLAY"

Takes over when BIN and the DEMO tape left off. How would you like 273 different user defined GRAPHICS on a 16K SPECTRUM or a GRAND 336 for a 48K. All of these can be displayed on the screen at the SAME TIME. UDGs are stored as PAGES and any TWO PAGES may be exchanged in memory. FILES can be LOADED FROM or SAVED TO TAPE. LOAD into any page location. TURN a UDG ¼ turn, ½ turn, FLIP a SHAPE over, REVERSE a SHAPE, EXPAND ¼ of a CHARACTER into a full character, UP, DOWN, LEFT or RIGHT by one PIXEL. 5 SHAPE FILES are included on TAPE. INCLUDING a 64 CHARACTERS per LINE DISPLAY. COMPLETE with DEMO PROGRAM and INSTRUCTIONS. JUST RELEASED at £7.00. 48K or 16K SPECTRUM only.

"TRaceON"

BASED on a FILM (GUESS WHICH). TRaceON is a REAL TIME ADVENTURE for those of you who can't handle ARCADE GAMES. Your TASK is to COMPLETE a TRILOGY of GAMES successfully. A poor PERFORMANCE will result in a RESTART as may CHEATING. MASTER the DISKS and YOU get to ride a LIGHT BIKE and then RUN the CORRIDORS of DEATH to reach the MASTER CONTROL. REALLY GOOD FRUSTRATING FUN. 48K SPECTRUM £4.50 (16K coming soon.)

"MATCALC"

For BUSINESS and PROFESSIONAL use. Ideal for WHAT IF situations, CASH FLOW FOREC STS and analysing RELATED figures. 64 character display option. FORMULA may be MATHEMATICAL or LOGICAL. MENU of FUNCTIONS. SAVE and LOAD DATA to TAPE. FULL instructions included. LITERALLY HUNDREDS of USES. BOTH 48K and 16K SPECTRUM PROGRAMS on ONE TAPE. JUST £7.00. EXCELLENT VALUE.

"PROGRAMMERS DREAM"

A SPECTRUM TOOLKIT. Position independent and just 1450 BYTES. Facilities RENUMBER lines or blocks any increment or start. BLOCK OR LINE MOVE including a RENUMBER into place if required. BLOCK OR LINE ERASE. CHANGE SELECTED STRINGS (NAMES OR CONTENTS). DUMP variable names and values (usable in a loop). DISPLAY PROGRAM or PROGRAM plus VARIABLE SIZE. INSTANT and CLEAN. JUST £6.95 with explicit instructions.

WORK FORCE

140 WILSDEN AVENUE, LUTON, BEDS, ENGLAND
ALSO AVAILABLE AT BUFFER, MICROWARE AND SOFTWARE SUPERMARKET.
REM WORK FORCE WORKS HARDER.

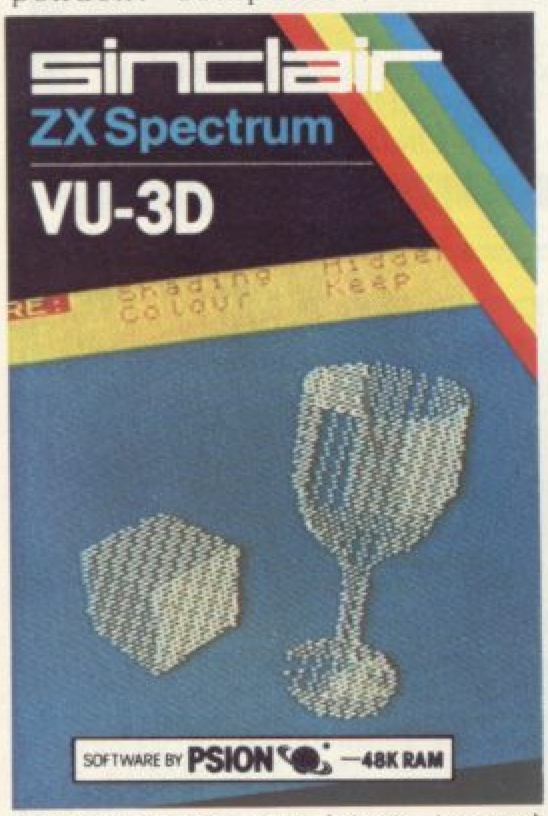


Sinclair acts to improve the standard of its named software

John Gilbert looks at the latest group of cassettes issued by Sinclair and finds that it is now setting the standards

A NEW BATCH of Sinclair Research software for the ZX-81 and Spectrum shows a marked improvement in the quality of programs and a continuation of fine artwork on the cassette inserts.

The reason is that the company is selling programs from other independent companies, such as



Melbourne House and Artic, instead of continuing to rely on Psion, Mikro-Gen and ICL.

The Hobbit takes first place in the new releases for quality and value for money. This adventure game, which the makers claim uses artificial intelligence, is discussed in Mind Games on page 93.

Vu-3D, for the 48K Spectrum, is another good offering from Psion. It allows the user to create a three-dimensional representation of an object on the television screen. The object can then be rotated and viewed from any angle. The objects can be displayed as wirework figures or can be shaded. They can also be magnified and reduced.

It is possible to store the figure on tape in a data file and re-load it to view again. The program costs £9.95 but even though it has some good features it still seems over-priced.

Games feature strongly in the new tapes. Sinclair is selling the Artic range of adventures, A, C and D. Adventure A works on the 16K or 48K Spectrum and 16K ZX-81 and is called **Planet of Death.**

You are stranded on a planet and must return to your spaceship. There is no guide to the keywords but with a little thought you can discover the help command. At times the suggestions can be very unhelpful and it is a good idea to construct a map, as some of the help suggestions may make you retrace your footsteps.

The next adventure so far released is C, called **Ship of Doom.** It can be run on the 48K Spectrum and 16K ZX-81.

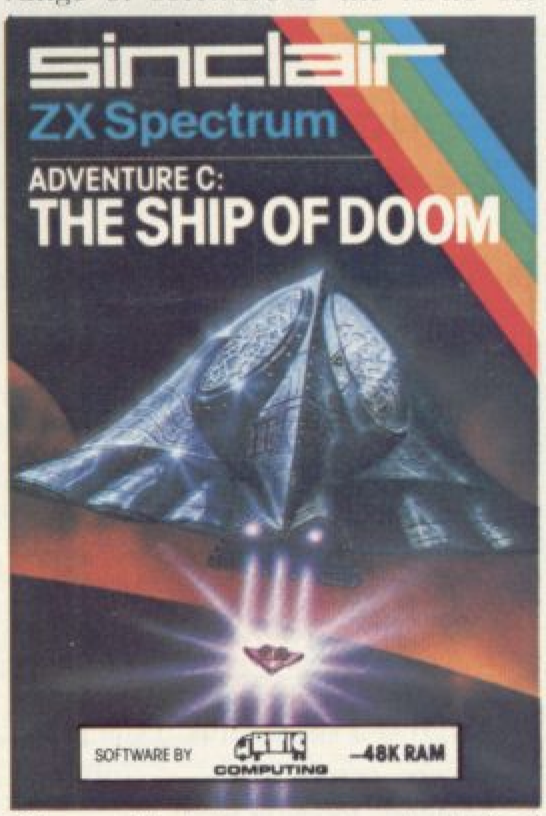
Your ship is captured by aliens who are searching for humanoids to replace their brains with micro-chips. The object of the game is to escape from the alien craft by breaking the gravitational field. To do so you must find the control room of the alien ship.

The help command is a little more useful in this game and it is easier to get further when first playing the game.

Adventure D, called **Espionage Island**, can be used on the 48K Spectrum or 16K ZX-81. You must escape from an aircraft which is about to crash into the Atlantic. You must then reach the island safely, avoid capture, and try to discover the secret of the island. The game is more difficult than the others and many people have not managed to get out of the aircraft, even though there is a parachute. All the adventures cost £6.95.

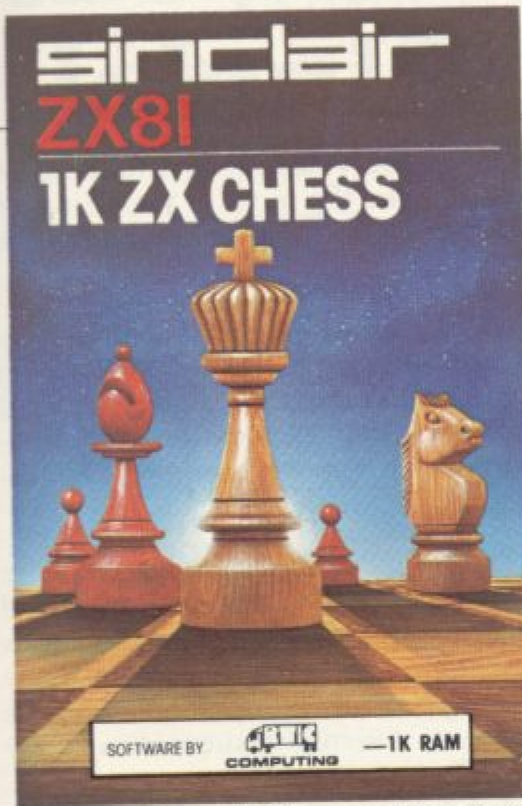
Leaving adventure games, **Reversi,** or **Othello** as it is sometimes called, can be played on the 16K Spectrum or 16K ZX-81. The game has nine levels, from novice to expert, and the computer is difficult to beat. The makers claim that Reversi reflects the strict contemporary morality of Victorian society but we believe that it can be traced to Arabic origins. Reversi costs £7.95.

An interesting addition to the range of software is the Artic **1K**



Chess. It takes some technical wizardry to squeeze this kind of game into the unexpanded ZX-81.

The game can be played using one of two opening moves. Because of the lack of memory, castling, pawn promotion and capturing *en passant*



are not allowed. The game loads in approximately 40 seconds and that is ideal for someone who wants a quick game of chess without having to load from a tape which takes several minutes.

The computer also makes its moves very fast for the amount of memory available to it. 1K Chess costs £4.95.

Super Glooper is an amusing game of Pac-man on the 16K ZX-81. Glooper must paint the maze before the aliens kill him. Unfortunately it is difficult to evade those aliens using the standard ZX-81 keyboard but it is not impossible. Glooper can also pick up one of the shields at the corners of the maze to protect himself and chase the aliens.

On the other side of the tape is **Frogs**, a game of Frogger. You must get the frogs over the river via the moving boats to the jetties on the other bank. If froggie falls into the river, it drowns.

You score points for each frog you get across the river and you can have eight frogs to send to their deaths. Super Glooper and Frogs cost £4.95.

Another game with a familiar-sounding theme is **Through the Wall.** It is based on Breakout and is available for the 16K ZX-81. On the other side of the cassette is **Scramble**, also a familiar theme. Both games on one cassette represent good value at £4.95.

A package for the 1K ZX-81, called **1K Games**, has also been released. The games include **Jackpot,** in which you must try to win the 25 pence jackpot from a one-armed bandit; **Etch and Sketch,** where you can draw pictures on the screen; and **Maze Game**, where you must find your way out of the conventional maze.

The release of this cassette, costing £4.95, is a good idea at a time when so many people are buying ZX-81s.

A basic **Toolkit** is available for the 16K ZX-81. It provides a series of machine code routines to make the job of programming easier. It includes a re-number routine, a search and replace routine, a merge routine to put together two separate Basic programs, and a routine to put a Basic program above RAMTOP and out of the way of the NEW command. The Toolkit costs £5.95.

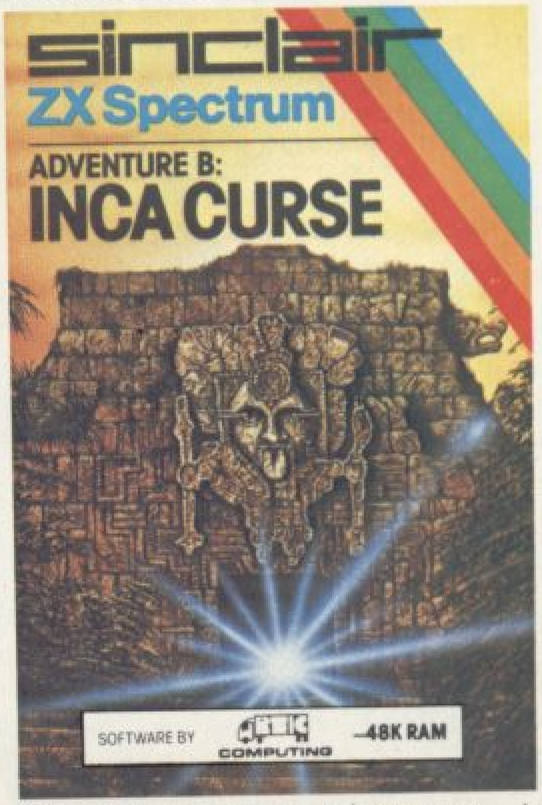
Two database programs are available in the range for the 48K Spectrum. They are called **Collector's Pack** and **Club Record Controller.**

Collector's Pack can be used to store information about coins, stamps or even records. The Club Record Controller will store information about people, such as addresses and telephone numbers. It would be useful to schools or even someone who runs a private club.



Both packages are easy to use and cost £9.95.

Adventure B, Inca Curse, for the 48K Spectrum is an upgrade of an adventure which Artic wrote for the



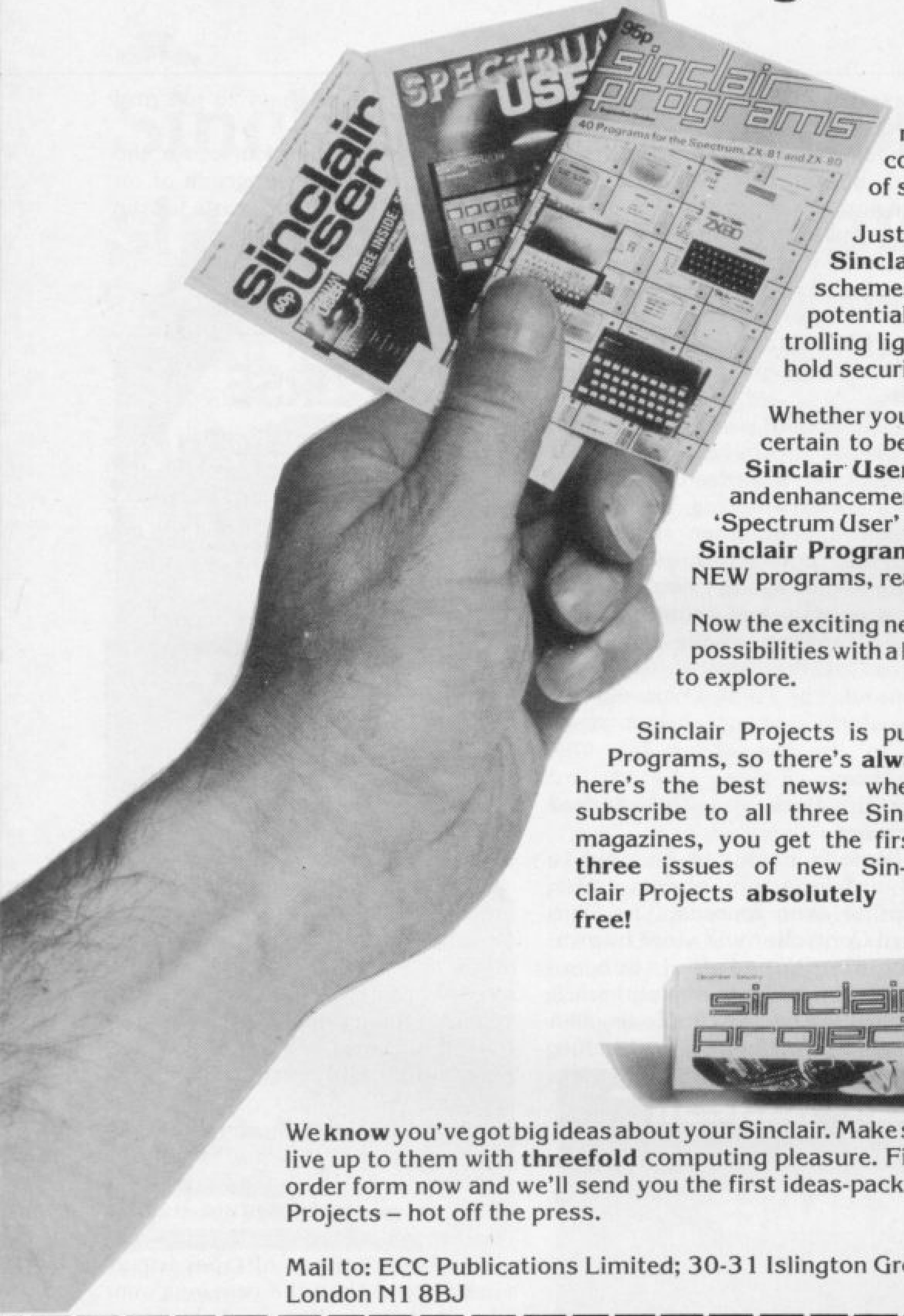
16K ZX-81. The adventurer is exploring in the jungle when he finds an Inca temple. The aim is to go in and drag out all the treasure, or as much as you can carry. It all seems so easy until you enter the game and step into the temple.

The authors have managed to cram a good deal into this adventure and the Artic top score of 3,200 points will take some beating. We must admit that it is not one of the adventures in which we have made much progress. Adventure B costs £6.95.

The latest release of tapes is certainly better than the previous one. The games, utility, and business areas have been covered well but there is still a lack of good educational software. The only tapes available tend to be multi-choice and question-and-answer sessions.

The Psion tapes seem to be the best for quality at the moment and the ones with the most interesting concepts. None of the cassettes reviewed was bad but The Hobbit, Vu-3D, 1K Chess, and Super Glooper seem best.

We've got big ideas about you and your Sinclair



Because we know you're always looking for new ideas to make the most of your Sinclair computer, we're making sure you never run out of steam!

Just launched — and out in December — was **Sinclair Projects** magazine, full of fascinating schemes to tax your skills and reveal the **practical** potential of your Sinclair in applications like controlling lights, upgrading computer graphics, household security, and many more.

Whether you're new to computing, or an old hand, you're certain to be an enthusiast. That's why we introduced **Sinclair User** magazine for the latest news, techniques and enhancements to **match** your enthusiasm (now with new 'Spectrum User' supplement!) Next, its companion magazine, **Sinclair Programs**, became an overnight success with 40 NEW programs, ready for you to key, in every issue.

Now the exciting new Sinclair Projects completes your store of possibilities with a huge increase in computing potential for you to explore.

Sinclair Projects is published on alternate months to Sinclair Programs, so there's **always** something new to test your skill. But here's the best news: when you subscribe to all three Sinclair magazines, you get the first **three** issues of new Sinclair Projects **absolutely free!**



We **know** you've got big ideas about your Sinclair. Make sure you live up to them with **threefold** computing pleasure. Fill out the order form now and we'll send you the first ideas-packed Sinclair Projects – hot off the press.

Mail to: ECC Publications Limited; 30-31 Islington Green, London N1 8BJ

Sinclair User / Spectrum User; Sinclair Programs; Sinclair Projects

Yes – I'd like to subscribe to:

☐ Sinclair User (12 issues – price £11.00)

☐ Sinclair Programs (6 issues – price £6.60)

☐ Sinclair Projects (6 issues – price £6.60) Remember you get the first three issues FREE if subscribing to all three magazines!

☐ I enclose a cheque for £ ____________ (deduct £3.30 from total cost if subscribing to all three publications)

☐ Please charge my credit card Card name ____________ Number ____________

Name ____________

Address ____________

Signature ____________ Date ____________

NB This offer applies to UK subscribers only. Overseas rates available on request.

PROGRAM PRINTOUT



The OBJECT of **Escape,** for the unexpanded ZX-81, is to lure your enemy, marked by a graphic F, into the hole. You decide where the hole is to be located at the beginning of the game when you are asked for the co-ordinates. Using the cursor keys you must round up this evil fellow and get him to step into the hole.

If he manages to jump on you, you are the one who dies, so be careful when you try to drop him down that hole. The program was sent by Tim Grubb of Linford, Leicestershire.

```
   5 PRINT "HOLE?"
   7 INPUT I
   8 INPUT U
   9 IF I>=21 OR I<10 OR U>=31 O
R U<10 THEN GOTO INT PI
  10 LET A=SIN PI
  20 LET B=A
  30 LET C=CODE "="
  40 LET D=CODE "2"
  50 IF INKEY$="0" THEN LET A=IN
T (RND*INT EXP PI)
  55 PRINT AT I,U;CHR$ 28
  60 IF INKEY$="0" THEN LET B=IN
T (RND*INT EXP PI)
  70 IF INKEY$="5" THEN LET B=B-
SGN PI
  80 IF INKEY$="6" THEN LET A=A+
SGN PI
  90 IF INKEY$="7" THEN LET A=A-
SGN PI
 100 IF INKEY$="8" THEN LET B=B+
SGN PI
 130~IF A>C THEN LET C=C+SGN PI
 140 IF C>A THEN LET C=C-SGN PI
 150 IF B>D THEN LET D=D+SGN PI
 160 IF D>B THEN LET D=D-SGN PI
 170 CLS
 180 PRINT AT A,B;CHR$ 128;AT C,
D;CHR$ 137
 185 IF A=1 AND B=U THEN PRINT "
YOU DUG YOUR OWN GRAVE";
 189 IF I=C AND U=D THEN PRINT "
HES FALLEN";
 190 IF A<>C OR B<>D THEN GOTO C
ODE "M"
 200 PRINT "YOURE DEAD"
```

SELECT is a simple but entertaining game, akin to the Simon game on the market. It is a test of memory, the television set displaying a series of colours which you have to re-create through the keyboard. The colours are accompanied by beeps, just to keep up the interest, and depressing groans accompany your inevitable mistakes.

Submitted by D Frampton of Bridgewater, Somerset. (16K Spectrum).

SELECT




```
  10 LET h$="?"
  15 LET HS=0
  20 GO SUB 600
  30 LET k=10
  40 LET b=1
 100 FOR f=1 TO 10
 110 LET b=b+1: DIM z(b)
 130 FOR g=1 TO b
 140 LET z(g)=INT (RND*9)
 150 IF z(g)>7 THEN GO TO 140
 160 NEXT g
 200 FOR h=1 TO b
 210 PAPER z(h): BORDER z(h): CL
S
 220 BEEP 1,z(h)
 230 NEXT h
 300 FOR i=1 TO b
 310 LET a$=INKEY$
 320 IF a$="" THEN GO TO 310
 330 IF a$<"0" OR a$>"7" THEN GO
 TO 310
 340 LET l=(0 AND a$="0")+(1 AND
 a$="1")+(2 AND a$="2")+(3 AND a
$="3")+(4 AND a$="4")+(5 AND a$=
"5")+(6 AND a$="6")+(7 AND a$="7
")
 345 IF l<>z(i) THEN GO TO 500
 350 PAPER l: BORDER l: CLS
 360 BEEP 1,l
 380 NEXT i
 390 NEXT f
 400 PAPER 1: BORDER 1: INK 7: C
LS
 410 PRINT AT 5,2;"You scored ";
k;" out of 10"
 420 IF k=10 THEN PRINT AT 7,7;
FLASH 1;"CONGRATULATIONS"
 425 IF k>HS THEN INPUT "You gai
ned a high score,enter   your na
me";h$: LET HS=k
 440 PRINT AT 12,4;"High Score="
;HS," by ";h$
 470 INPUT "Another game";y$
 480 IF y$="y" THEN GO TO 20
 490 PRINT AT 15,10;"O.K.Don't":
 STOP
 500 PAPER 1: INK 7: CLS : FOR n
=1 TO 22: PRINT FLASH 1; BRIGHT
1;"WRONG"': NEXT n
 505 PLOT 125,85: DRAW 70,40: PL
OT 125,85: DRAW -70,-40: PLOT 12
5,85: DRAW -70,40: PLOT 125,85:
DRAW 70,-40
 510 LET k=k-1
 520 BEEP 3,-20: BEEP 3,-35
 530 PRINT PAPER 1; INK 7;AT 20,
6;"Press any key to continue"
 540 PAUSE 0
 550 LET b=1
 560 GO TO 390
 600 PAPER 1: BORDER 1: INK 7: C
LS
 610 PRINT AT 0,10;"SEQUENCE";AT
 0,10; OVER 1;"__________"
 620 PRINT '"The idea of the gam
e is to"
 630 PRINT '"follow my sequence
of colours"
 640 PRINT '"and beeps by pressi
ng a key,0"''"to  7, correspondi
ng to  my"''"sequence of colours
.";
 650 PRINT "For example"''"if th
e colours are green,red,"''"then
 yellow you would press 4,2,"''"
then 6.";
 660 PRINT "When you get a seque
nce"''"correct the next one is l
onger."
 670 PRINT AT 20,7;"Press any ke
y"
 680 PAUSE 0: CLS
 690 PRINT ''"If you get a seque
nce wrong then"
 700 PRINT '"the next one will c
onsist of two"''"colours."
 710 PRINT '"Your score and the
high score is"''"displayed after
 ten goes."
 720 PRINT AT 14,3;"Press any ke
y to start."
 730 PAUSE 0: CLS : RETURN
```

I F YOU have difficulty learning or teaching the vocabulary of a foreign language, **Language Tutor** is for you.

At the start of the program a menu is displayed, giving the user a number of options. Initially you will want to enter the word list, so press E. The computer will ask what the language is and how many words you wish to enter.

As the program stands, the words can be up to 10 letters in length but that can be altered by changing the "10" in lines 9052, 9053 and 9125. If the words are longer, the number which can be stored naturally will be reduced.

In the test mode, the student will be asked to translate from the chosen language into English and vice versa. A running score is kept of the student's successes and there is a high score facility.

Michael Coombes of Caerleon, Gwent, who submitted the program, sent a list of 20 German words and their English translations but said that the machine would accept many times that amount of data. Lower-case letters in the listing signify inverse video. (16K ZX-81).

LANGUAGE TUTOR

```
   6 LET HS=0
   7 LET N$=""
  10 PRINT AT 0,0;"LANGUAGE TUTO
R",,"-------- -----"
  15 GOSUB 4000
  20 PRINT AT 6,0;"PLEASE SELECT
:",,,,"PRESS e TO ENTER NEW WORD
 LIST.",,,"PRESS t TO START THE
TEST.",,,"PRESS s TO SAVE THE PR
OGRAM WITHTHE WORD LIST.",,,,"PR
ESS w TO SAVE THE PROGRAM      WI
THOUT THE WORD LIST.",,,"PRESS x
 TO EXIT."
  30 IF INKEY$="E" THEN GOTO 900
0
  40 IF INKEY$="T" THEN GOTO 500
  50 IF INKEY$="S" THEN GOTO 600
0
  60 IF INKEY$="W" THEN GOTO 700
0
  70 IF INKEY$="X" THEN GOTO 800
0
  80 GOTO 30
 500 GOSUB 4000
 505 LET S=0
 510 PRINT AT 5,0;"HOW MANY QUES
TIONS DO YOU WANT?"
 520 INPUT N
 530 PRINT ,,"HERE ARE YOUR QUES
TIONS..."
 540 FOR F=1 TO 100
 550 NEXT F
 560 GOSUB 4000
 570 FOR Q=1 TO N
 580 GOSUB 4040
 590 PRINT AT 4,0;"QUESTION NUMB
ER ";Q;":"
 600 LET A=INT (RND*100)
 610 IF A<50 THEN GOTO 800
 620 GOTO 900
 630 INPUT S$
 632 IF A<50 THEN LET M$=A$(H)(1
TO M(H))
 634 IF A>49 THEN LET M$=B$(H)(1
TO N(H))
 640 PRINT AT 12,0;S$
 650 IF S$=M$ THEN LET S=S+1
 660 IF S$=M$ THEN PRINT AT 18,0
;"**WELL DONE,THAT IS CORRECT**"
 670 IF S$<>M$ THEN PRINT AT 15,
0;"NO,THAT IS wrong.THE ANSWER W
AS ";M$
 680 PRINT AT 20,0;"YOUR SCORE S
O FAR IS ";S
 690 FOR F=1 TO 100
 700 NEXT F
 710 NEXT Q
 720 GOTO 1000
 800 LET H=((RND*(W-1)+1))
 805 LET Z$=B$(H)(1 TO N(H))
 810 PRINT ,,,,"WHAT IS THE ENGL
ISH WORD FOR",Z$;"?"
 820 GOTO 630
 900 LET H=((RND*(W-1)+1))
 905 LET Z$=A$(H)(1 TO M(H))
 910 PRINT ,,,,"WHAT IS THE ";X$
;" WORD FOR ",Z$;"?"
 920 GOTO 630
1000 PRINT AT 4,0;"
          "
1010 GOSUB 4000
```



```
1020 PRINT AT 6,0;"YOUR FINAL SC
ORE FOR THIS TEST  IS ";S
1030 IF S>HS THEN GOTO 1500
1035 PRINT ,,,,
1040 IF N$<>"" THEN PRINT "THE T
OP SCORE SO FAR IS ";HS;"."
1050 IF N$<>"" THEN PRINT ,,"THI
S SCORE WAS ACHIEVED",,,"BY ";N$
;"."
1100 PRINT AT 20,0;"PRESS m TO R
ETURN TO THE MENU    PRESS r FOR
A RE-TEST"
1110 IF INKEY$="R" THEN GOTO 500
1120 IF INKEY$="M" THEN GOTO 10
1130 GOTO 1110
1500 PRINT ,,,,"****************
***************"
1510 PRINT ,,,,"WELL DONE.YOU HA
VE BEATEN THE    HIGH SCORE.PLEAS
E ENTER YOUR     NAME..."
1520 PRINT ,,,,"****************
***************"
1530 INPUT N$
1535 LET HS=S
1540 GOTO 1100
4000 LET D=21
4005 FOR F=5 TO D
4010 PRINT AT F,0;"
                                "
4020 NEXT F
4030 RETURN
4040 LET D=18
4050 GOTO 4005
6000 LET J=0
6005 GOSUB 4000
6010 PRINT AT 8,0;"INSERT CASSET
TE AND START","THE CASSETTE PLAY
ER RUNNING",,,,,"PRESS ANY KEY W
HEN YOU ARE READY"
6020 IF INKEY$="" THEN GOTO 6020
6025 IF J=1 THEN CLEAR
6027 CLS
6030 SAVE "LANGUAGe"
6035 GOTO 1
7000 LET J=1
7020 GOTO 6005
8000 GOSUB 4000
8010 PRINT AT 8,0;"TYPE ""CONT""
 TO RESTART THE        PROGRAM."
8020 STOP
8030 GOTO 10
9000 GOSUB 4000
9010 PRINT AT 5,0;"WHAT IS THE F
OREIGN LANGUAGE?"
9020 INPUT X$
9030 PRINT ,,X$
9040 PRINT ,,"HOW MANY WORDS?"
9050 INPUT W
9052 DIM A$(W,10)
9053 DIM B$(W,10)
9055 DIM M(W)
9057 DIM N(W)
9060 PRINT ,,W
9070 PRINT ,,"PLEASE ENTER THE W
ORDS..."
9072 FOR F=1 TO 50
9074 NEXT F
9080 GOSUB 4000
9100 FOR F=1 TO W
9110 PRINT AT 12,0;"
                     ";AT 8,0;"EN
TER ENGLISH WORD"
9120 INPUT E$
9125 IF LEN E$>10 OR E$="" THEN
GOTO 9120
9130 LET M(F)=LEN E$
9140 LET A$(F)=E$
9150 PRINT ,,E$
9150 PRINT ,,E$
9160 PRINT AT 12,0;"ENTER ";X$;"
 WORD"
9170 INPUT E$
9175 IF LEN E$>10 OR E$="" THEN
GOTO 9170
9180 LET N(F)=LEN E$
9190 LET B$(F)=E$
9200 PRINT ,,E$
9210 PRINT AT 10,0;"            ";
AT 14,0;"              "
9220 NEXT F
9230 GOSUB 4000
9240 PRINT AT 5,0;"ALL DATA ENTE
RED.",,,"ARE THERE ANY CORRECTIO
NS? (Y/N)"
9250 IF INKEY$="N" THEN GOTO 928
0
9260 IF INKEY$="Y" THEN GOTO 900
0
9270 GOTO 9250
9280 GOSUB 4000
9290 GOTO 10
```



GOLF TWO

```
   1 REM "golf"
   3 PAPER 5
   4 BORDER 2
  10 PRINT TAB 13; INK 2;"GOLF©"
  20 LET t=15*(1+RND)
  30 PRINT AT 21,0; INK 4;"████
████████████████████████████"
  40 PRINT AT 21,t-1; INK 5;"█"
  50 INPUT "SWING = ";s
  51 IF s>=85 THEN GO TO 1
  60 PRINT AT 3,0;"SWING = ";s
  70 INPUT "DRIVE= ";d
  80 PRINT "DRIVE= ";d
  90 LET a=d*COS (PI*s/180)
 100 LET b=d*SIN (PI*s/180)
 110 FOR j=0 TO b/16 STEP .3
 115 LET c=.01*(b*j-16*j*j)
 120 IF a*j>6200 THEN GO TO 190
 130 IF c>40 THEN GO TO 170
 140 INK 7
 150 PLOT .04*a*j,4*c+8
 160 BEEP .005,c+10
 170 NEXT j
 180 IF ABS (a*b/3200-t)<1 THEN
GO TO 210
 190 PRINT AT 10,20;"MISSED!"
 200 PAUSE 200
 202 CLS
 203 GO TO 1
 220 PRINT AT 20-j,t-2;"HOLE IN
1": BEEP .3,6-3*j
 230 NEXT j
 235 PAUSE 200
 240 CLS
 245 GO TO 1
```

IN THE JULY issue we published a version of Golf for the ZX-81. The author of that program, A Baines of Ashton-under-Lyne, Lancashire, has updated that program for the Spectrum. As he says, **Golf Two** is improved by the use of sound and colour.

You are shown a small patch of green and are required to enter first the angle at which you want the ball to travel on its trajectory and, second, the strength with which you want to hit it. The last figure usually is in the range 350 to 490. (16K Spectrum).

IF YOU have an unfulfilled craving for power, **Ruler** will provide a painless way of getting it. At the start of the game, you have 200 lb. of seed corn and 100 people. You must divide the corn so that you have sufficient to feed to population and plenty left to sow for the following year.

If you calculations are correct, the amount of food and of people will increase. When they have both passed the 1,000 mark, the screen will display God save the King and the game is over.

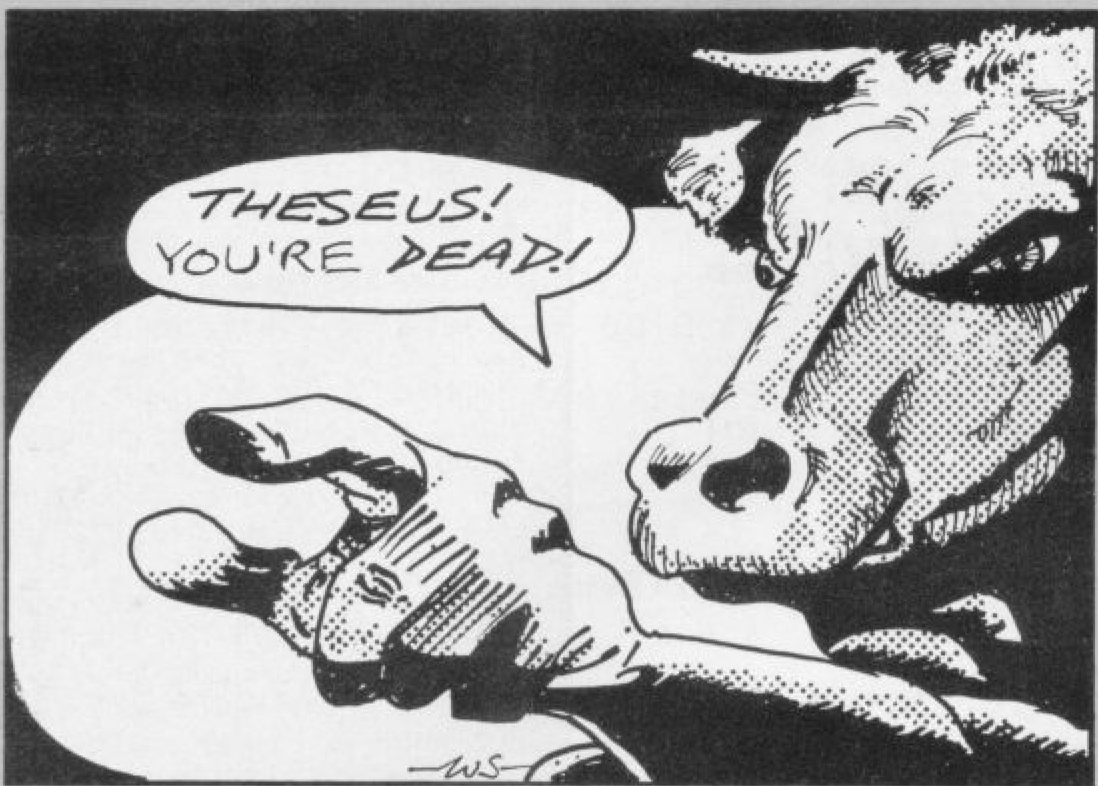
Since the program runs in 1K of RAM it naturally cannot have many frills. The only randomising factor is the prospect of storms ruining the crops. With more RAM or with a memory-saving purge, you should be able to add a few extras.

Ruler was sent by A Greenhalgh of Darwen, Lancashire, for the unexpanded ZX-81.




```
  10 LET P=100
  20 LET F=200
  30 LET X=INT (RND*5)
  40 PRINT F;"LBS OF FOOD ";P;"
PEOPLE"
  60 PRINT "INPUT FOOD FOR SOWIN
G"
  70 INPUT S
  80 PRINT "FOR YOUR PEOPLE"
  90 INPUT T
  91 IF S+T>F THEN GOTO 60
  95 LET Z=F-(S+T)
 110 LET P=INT (F/P)*(P/2)+F
 120 IF P<10 THEN PRINT "YOUR PE
OPLE HAVE LEFT YOU";W
 140 IF X=3 THEN GOSUB 200
 141 LET F=INT (Z+(S*3.5))
 142 IF P>1000 AND F>1000 THEN P
RINT "GOD SAVE THE KING";W
 145 PAUSE 250
 146 CLS
 150 GOTO 40
 200 PRINT "STORMS HAVE RUINED Y
OUR CROPS"
 210 LET S=0
 220 RETURN
```

MINOTAUR



MINOTAUR is an excellent maze game for the expanded ZX-81. The display is a random-generated maze with yourself as an "O". Your task is to reach the exit at bottom right by using the four cursor keys. Your main problem is to avoid the hungry Minotaur which is able to home-in on your position.

We were impressed by the intelligence shown by the beast, which is able to check its position against yours, without slowing the program. The routine used would obviously be useful in composing a Pacman-style program.

Occasionally the random maze proves to be blocked, so a quick visual check is a good idea. Sent by Kevin Tutte of Sutton Cold field, West Midlands.

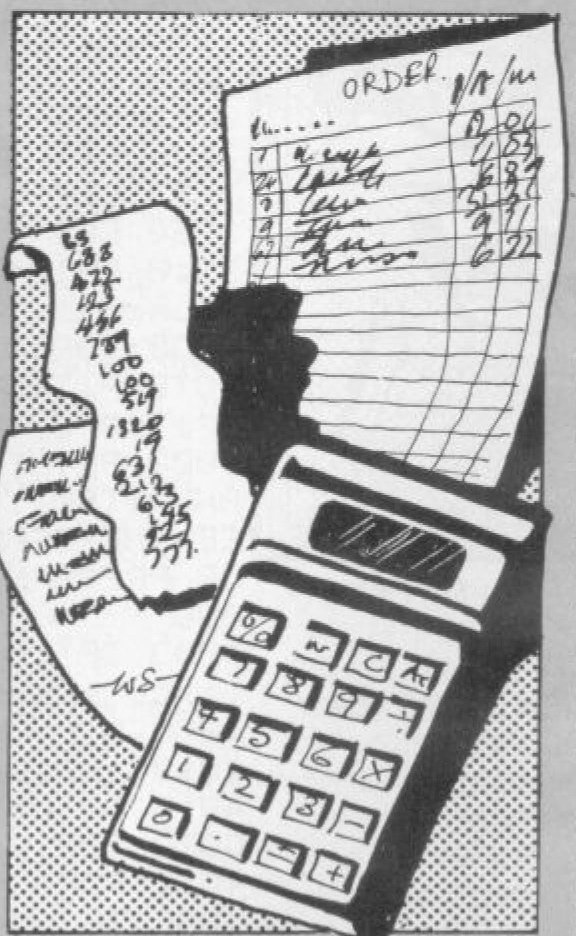
```
  20 FAST
  30 DIM M$(21,31)
  40 FOR M=1 TO 19 STEP 2
  50 LET M$(M)="(thirty one inve
rse SPACEs)"
  60 FOR N=1 TO 3
  70 LET M$(M,INT (RND*28)+2)="
"
  80 NEXT N
  90 LET M$(M+1,1)=" "
 100 LET M$(M+1,31)=" "
 110 NEXT M
 120 LET M$(1)="(thirty one inve
rse SPACEs)"
 130 LET M$(21)=M$(1)
 140 FOR M=4 TO 18
 150 LET R=INT (RND*28)+2
 160 IF M$(M-1,R)<>" " AND M$(M+
1,R)<>" " THEN LET M$(M,R)="(inv
erse SPACE)"
 170 NEXT M
 180 LET M$(20,30)="(graphic A)"
 200 LET X=2
 210 LET Y=2
 220 LET CX=2
 230 LET CY=20
 240 LET D=-1
 400 FOR N=1 TO 21
 410 PRINT AT N,1;M$(N)
 420 NEXT N
 430 SLOW
 500 PRINT AT Y,X;" "
 510 LET X=X+(INKEY$="8" AND M$(
Y,X+1)<>"(inverse SPACE)")-(INKE
Y$="5" AND M$(Y,X-1)<>"(inverse
SPACE)")
 520 LET Y=Y+(INKEY$="6" AND M$(
Y+1,X)<>"(inverse SPACE)")-(INKE
Y$="7" AND M$(Y-1,X)<>"(inverse
SPACE)")
 530 PRINT AT Y,X;"O"
 540 IF X=30 AND Y=20 THEN GOTO
600
 550 PRINT AT CY,CX;" "
 560 GOSUB (1000*(1+(CY=Y)+2*(M$
(CY+1,CX)<>"(inverse SPACE)" AND
 (Y>CY))+3*(M$(CY-1,CX)<>"(inver
se SPACE)" AND (Y<CY))))
 570 PRINT AT CY,CX;"(inverse QU
OTATION MARK)"
 580 GOTO 500
 600 PRINT AT 0,1;"WELL DONE YOU
 ESCAPED";
 610 STOP
 700 PRINT AT 0,1;"BAD LUCK YOU
HAVE BEEN EATEN"
 710 STOP
1000 IF M$(CY,CX+D)="(inverse SP
ACE)" THEN LET D=-D
1020 LET CX=CX+D
1030 RETURN
2000 LET D=(CX<X)-(CX>X)
2010 IF CX=X THEN GOTO 700
2020 IF M$(CY,(CX-1) TO (CX+1))=
"(inverse SPACE;SPACE;inverse SP
ACE)" THEN LET D=0
2030 GOTO 1000
3000 LET CY=CY+1
3010 IF CX<>X THEN LET D=(CX<X)-
(CX>X)
3020 RETURN
4000 LET CY=CY-1
4010 IF CX<>X THEN LET D=(CX<X)-
(CX>X)
4020 RETURN
```

ZX ACCOUNTS

N W RHODES of Braintree, Essex is a studying A level accounts. He has written a program which he feels will be of help to anyone following the same course.

The routine allows the user to input a trial balance and will then draw up a trading account — things like stock and gross profit, a profit and loss account showing all expenses with nett profit, and a balance sheet showing current assets, depreciation of fixed assets, current and fixed liabilities, as well as the final balance sheets on both sides. All three of those accounts are available under menu control.

Rhodes claims the following novel features for his listing: First, that option six allows the user to change the value of any account and see the effect on the three amounts. As soon as any single account is changed, all the accounts which are affected are updated with the new balance.



Second, that a summary gross profit, nett profit, total expenses and new capital are given after each alteration and that incorporates a routine which displays a message if the effect of the alterations will cause the balance sheet not to balance.

Users must remember never to enter RUN, or all the variables will be lost, and that when one value is changed it will usually be necessary to alter another account value, For example, if the value of sales is increased, the user must increase the value of either the cash or bank account, so that everthing balances. It is also essential that accounts to be altered must be entered as the abbreviations shown between lines 201 and 234.

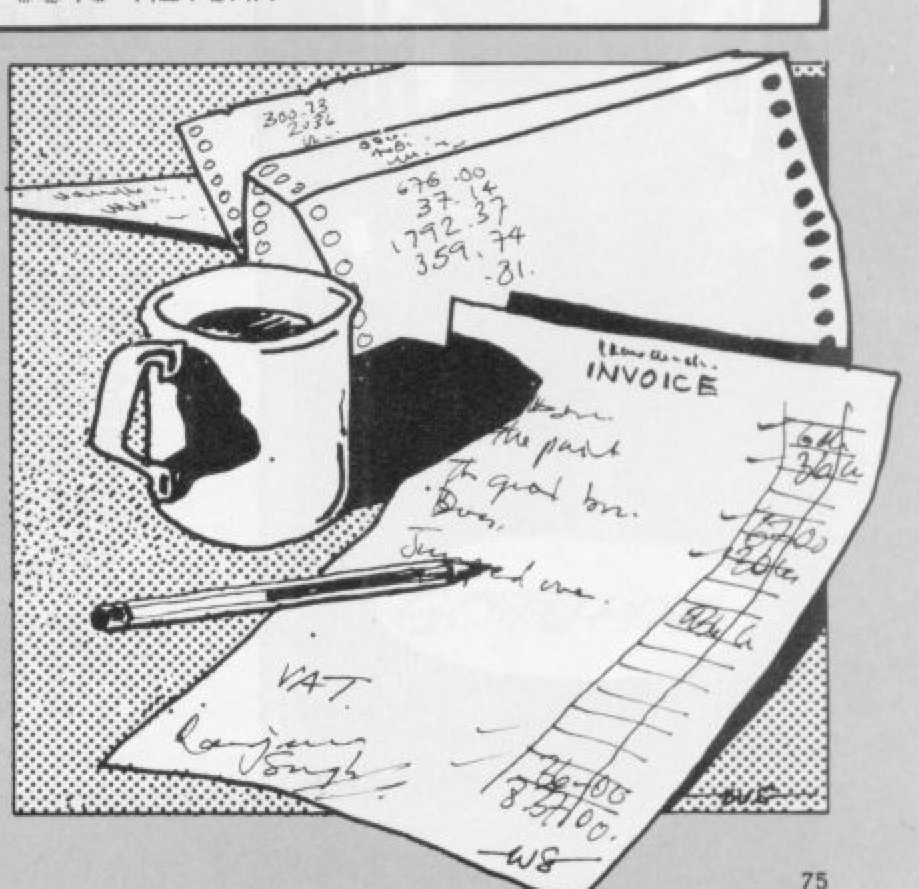
Lower-case letters in our listing signify inverse video, unless they appear inside brackets, where they give graphics intructions (16K ZX-81).

```
  0 REM ZX81 ACCOUNTS SYSTEM
  1 REM M W RHODES NOV  1982
 10 GOTO 100
 20 CLS
 30 PRINT AT 10,9;"FILE NAME?"
 40 INPUT N$
 50 PRINT AT 12,8;"PRESS NEWLIN
    E"
 55 IF N$="" THEN PRINT AT 14,6
;"INVALID FILE NAME"
 60 INPUT I$
 65 IF N$="" THEN GOTO 20
 70 CLS
 80 SAVE N$
190 GOTO 500
199 REM vocabulary
200 DIM A$(34,10)
201 LET A$(1)="OP STOCK"
202 LET A$(2)="PURCHASES"
203 LET A$(3)="RET OUT"
204 LET A$(4)="CARR IN"
205 LET A$(5)="CL STOCK"
206 LET A$(6)="SALES"
207 LET A$(7)="RET IN"
208 LET A$(8)="DISC ALL"
209 LET A$(9)="BAD DEBTS"
210 LET A$(10)="PROV "" """
211 LET A$(11)="WAGES"
212 LET A$(12)="INSURANCE"
213 LET A$(13)="PROV DEP"
214 LET A$(14)="ADV EXP"
215 LET A$(15)="SALES COM"
216 LET A$(16)="RENT"
217 LET A$(17)="LIGHT/HT"
218 LET A$(18)="LOAN INT"
219 LET A$(19)="GEN EXP"
220 LET A$(20)="TOTAL P/P"
221 LET A$(21)="TOTAL OWE"
222 LET A$(22)="DISC REC"
223 LET A$(23)="RENT REC"
224 LET A$(24)="DIVI REC"
225 LET A$(25)="INTR REC"
226 LET A$(26)="CAPITAL"
227 LET A$(27)="DRAWINGS"
228 LET A$(28)="LOANS"
229 LET A$(29)="CREDITORS"
230 LET A$(30)="OVERDRAFT"
231 LET A$(31)="F ASSETS"
232 LET A$(32)="DEBTORS"
233 LET A$(33)="CASH-BANK"
234 LET A$(34)="CASH-HAND"
235 REM end vocabulary
240 RETURN
500 REM  menu
505 CLS
510 PRINT AT 0,0;"zx accounts s
ystem"
515 PRINT AT 5,0;"OPTIONS:"
520 PRINT ,,"(1) SET UP NEW DAT
A",,,"(2) PRINT CURRENT DATA",,,
"(3) TRADING A/C",,,,"(4) PROFIT
 AND LOSS A/C",,,"(5) BALANCE SH
EET",,,"(6) CHANGE A SINGLE ITEM
",,,"(7) CALCULATE DEPRECIATION"
```




```
,,,"(8) SAVE PROGRAM AND DATA"
 530 INPUT J
 535 CLS
 540 IF J<1 OR J>8 THEN GOTO 600
 550 IF J=1 THEN GOTO 1000
 555 IF J=2 THEN GOTO 4500
 560 IF J=3 THEN GOTO 5000
 570 IF J=4 THEN GOTO 5500
 575 IF J=5 THEN GOTO 6000
 580 IF J=6 THEN GOTO 3000
 585 IF J=7 THEN GOTO 7000
 590 IF J=8 THEN GOTO 20
 595 GOTO 500
 600 CLS
 610 PRINT AT 10,5;"ERROR INVALI
D INPUT"
 620 FOR N=1 TO 70
 630 NEXT N
 640 CLS
 650 GOTO 500
1000 REM read in trial balance
1005 GOSUB 200
1010 DIM A(34)
1020 FOR N=1 TO 34
1030 PRINT A$(N);"£";
1040 INPUT A(N)
1050 PRINT A(N)
1055 IF N=18 THEN GOSUB 9500
1060 NEXT N
1070 GOSUB 9500
3000 REM calculations
3005 CLS
3010 LET TOT1=(A(1)+A(2)-A(3)+A(
4))
3020 LET TOT2=TOT1-A(5)
3030 LET TOT3=A(6)-A(7)
3040 LET GP=TOT3-TOT2
3050 LET TOT4=GP+TOT2
3060 LET TOT5=TOT3
3070 LET TOTEXP=A(8)+A(9)+A(10)+
A(11)+A(12)+A(13)+A(14)+A(15)+A(
16)+A(17)+A(18)+A(19)-A(20)+A(21
)
3080 LET TOT6=(GP+A(22)+A(23)+A(
24)+A(25))
3090 LET NETP=TOT6-TOTEXP
3100 LET TOT7=TOTEXP+NETP
3200 LET TOT8=A(31)-A(13)
3210 LET TOT9=A(5)+A(32)-A(10)+A
(20)+A(33)+A(34)
3220 LET TOT10=A(26)+NETP
3230 LET TOT11=TOT10-A(27)+A(28)
3240 LET TOT12=A(29)+A(21)+A(30)
3250 LET LHS=TOT11+TOT12
3260 LET RHS=TOT9+TOT8
3310 PRINT AT 0,4;" summary of d
ocuments ",,,,,"GROSS PROFIT","£
";GP;TAB 0;"TOTAL EXPENSES","£";
TOTEXP;TAB 0;"NET PROFIT","£";NE
TP;TAB 0;"NEW CAPITAL","£";TOT11
4000 PRINT ,,"ENTER THE NAME OF
ANY ITEM YOU  WISH TO ALTER TO S
EE THE EFFECT ON THE PROFIT ETC
OR PRESS N/L  TO RETURN TO THE M
ENU"
4003 IF LHS<>RHS THEN PRINT " ba
lance sheet does not balance."
4005 DIM C$(1,10)
4010 INPUT C$(1)
4015 IF C$(1)="          " THEN
GOTO 500
4020 FOR L=1 TO 34
4030 IF C$(1)=A$(L) THEN GOTO 41
00
4040 NEXT L
4050 PRINT ,,C$(1);" NOT FOUND"
4060 GOTO 4005
4100 PRINT ,,C$(1),,,,"NEW AMOUN
T?"
4110 INPUT A(L)
4130 GOTO 3000
4500 REM  current data
4505 CLS
4510 FOR X=1 TO 34
4520 PRINT A$(X);"£";A(X)
4530 IF X=19 THEN GOTO 4550
4540 NEXT X
4542 PRINT AT 21,0;"     Press ne
wline for menu      "
4545 INPUT P$
4547 GOTO 500
4550 PRINT AT 21,0;"     Press ne
wline to continue   "
4560 INPUT P$
4570 CLS
4580 GOTO 4540
5000 REM  trading a\c
5010 PRINT AT 0,6;" trading acco
unt "
5020 PRINT ,,,,
5030 FOR X=1 TO 4
5035 PRINT TAB 0;A$(X);A(X)
5040 NEXT X
5045 PRINT TAB 10;"(five graphic
 7s)";TAB 10;TOT1
5050 PRINT TAB 0;A$(5);A(5)
```

```
5055 PRINT TAB 10;"(five graphic
 7s)";TAB 10;TOT2
5060 PRINT TAB 0;"GROSS PFT";TAB
 10;GP;TAB 10;"(five graphic 6s)
";TAB 10;TOT4;TAB 10;"(five grap
hic 7s)"
5070 PRINT AT 3,16;A$(6);A(6);TA
B 16;A$(7);A(7);TAB 26;"(five gr
aphic 7s)";TAB 26;TOT3
5080 PRINT AT 13,26;"(five graph
ic 6s)";TAB 26;TOT5;TAB 26;"(fiv
e graphic 7s)"
5090 PRINT AT 18,0;"Press any ke
y for menu"
5100 IF INKEY$="" THEN GOTO 5100
5110 GOTO 500
5500 REM  profit and loss
5510 PRINT AT 0,3;" profit and l
oss account "
5520 PRINT ,,,,,,
5530 FOR X=8 TO 21
5540 PRINT A$(X);A(X)
5550 NEXT X
5560 PRINT TAB 0;"NET PROF";TAB
10;NETP;TAB 10;"(five graphic 6s
)";TAB 10;TOT7;TAB 10;"(five gra
phic 7s)"
5570 PRINT AT 4,17;"GROSS PR";TA
B 27;GP
5580 FOR X=22 TO 25
5590 PRINT TAB 17;A$(X);A(X)
5600 NEXT X
5610 PRINT AT 19,27;"(five graph
ic 6s)";TAB 27;TOT6;TAB 27;"(fiv
e graphic 7s)"
5620 IF INKEY$="" THEN GOTO 5620
5630 GOTO 500
6000 REM  balance sheet
6010 PRINT AT 0,7;" balance shee
t "
6020 PRINT ,,,,,,
6030 PRINT A$(26);A(26);TAB 0;"N
ET PROF";TAB 10;NETP;TAB 10;"(fi
ve graphic 7s)";TAB 10;TOT10
6040 PRINT TAB 0;A$(27);A(27);TA
B 10;"(five graphic 6s)";TAB 10;
TOT11;TAB 0;A$(28);A(28)
6050 PRINT ,,
6060 PRINT A$(29);A(29);TAB 0;A$
(21);A(21);TAB 0;A$(30);A(30);TA
B 10;"(five graphic 6s)";TAB 10;
TOT12
6070 PRINT ,,TAB 10;"(five graph
ic 6s)";TAB 10;LHS;TAB 10;"(five
 graphic 7s)"
6080 PRINT AT 4,17;A$(31);A(31);
TAB 17;A$(13);A(13);TAB 27;"(fiv
e 7s)";TAB 27;TOT 8
6090 PRINT
6100 PRINT TAB 17;A$(5);A(5);TAB
 17;A$(32);A(32);TAB 17;A$(9);A(
9);TAB 17;A$(10);A(10);TAB 17;A$
(20);A(20);TAB 17;A$(33);A(33);T
AB 17;A$(34);A(34)
6110 PRINT TAB 27;"(five graphic
 6s)";TAB 27;TOT9
6120 PRINT ,,TAB 27;"(five graph
ic 6s)";TAB 27;RHS;TAB 27;"(five
 graphic 7s)"
6130 IF INKEY$="" THEN GOTO 6130
6140 GOTO 500
7000 REM depreciation
7010 CLS
7015 PRINT TAB 1;" calculation o
f depreciation "
7020 PRINT AT 6,0;"ENTER THE FOL
LOWING INFORMATION REGARDING YOU
R REQUIREMENTS FOR DEPRECIATION
OF FIXED ASSETS ANDTHE AMOUNT TO
 CHARGE EACH YEAR  WILL BE DISPL
AYED BY STRAIGHT   LINE METHOD O
F CALCULATION"
7030 PRINT ,,"VALUE OF ASSET?",
7040 INPUT VAL
7050 PRINT "£";VAL
7060 PRINT "NO OF YEARS?",
7070 INPUT N
7080 PRINT N
7090 PRINT "EXPECTED VALUE AFTER
 ";N;" YEARS"
7100 INPUT V2
7105 PRINT
7110 PRINT "£";V2
7120 LET DEP=(VAL-V2)/N
7130 PRINT ,,"CHARGE £";INT (DEP
*100)/100;" EACH YEAR"
7140 PRINT AT 21,0;"      Press n
ewline for menu      "
7150 INPUT P$
7160 GOTO 500
9500 PRINT AT 21,2;" enter y if
this is correct "
9510 INPUT R$
9520 IF R$<>"Y" THEN RUN
9530 CLS
9540 RETURN
```



SPECTRUM LASER




```
   1 PRINT INK 0;AT 11,2;"      L
ASER @ R. Hartley.": PAUSE 300:
CLS
   2 PRINT "TEN ALIEN SPACE FIGH
TERS ARMED   WITH THE LATEST WEA
PONS SEEN   APPROACHING   YOUR
 TWIN LASER TURRET. YOU MUST DES
TROY ALL TEN TO SURVIVE. FIGHTER
S WILL FIRE 15 SECONDS AFTER SIG
HTING."
   3 PRINT "INSTRUCTIONS:"
   4 PRINT "PRESS:"
   5 PRINT INK 1;"5  TO MOVE LAS
ER RIGHT"
   6 PRINT INK 1;"6  TO ELEVATE
LASER"
   7 PRINT INK 1;"7  TO LOWER LA
SER"
   8 PRINT INK 1;"8  TO MOVE LAS
ER LEFT"
   9 PRINT INK 3;"0  TO FIRE LAS
ER"
  10 PRINT INK 4;AT 16,5;"PRESS
ANY KEY TO START"
  11 IF INKEY$="" THEN GO TO 11
  12 IF INKEY$<>"" THEN GO TO 13
  14 GO SUB 8000
  15 INK 2: PAPER 0: BORDER 1: C
LS
  20 PRINT "██████████████████████
██████████"
  30 FOR n=0 TO 18: PRINT AT n,0
;"█";AT n,31;"█": NEXT n
  35 FOR n=0 TO 31
  40 PRINT AT 19,n;"█";AT 20,n;"
█";AT 21,n;"█"
  50 NEXT n
  60 PRINT FLASH 1; INK 6;AT 19,
0;"█";AT 19,31;"█"
  70 PRINT INK 7; PAPER 0;AT 20,
14;"ALIENS HIT"
  80 PRINT FLASH 1; INK 4;AT 20,
11;"█"
  81 PRINT FLASH 1; INK 7;AT 20,
5;"ALERT"
 590 LET rf=0: LET c=0: LET sc=0
 600 REM target
 605 LET a$=" ⊕ ": LET c$="┣█┫"
 610 LET d=14: LET a=22
 620 LET r1=INT (RND+.5): IF r1=
0 AND d>4 THEN LET d=d-1: IF r1=
1 AND d<17 THEN LET d=d+1
 630 LET r2=INT (RND+.5): IF r2=
0 AND a>2 THEN LET a=a-1: IF r2=
1 AND a<16 THEN LET a=a+1
 641 IF INKEY$="5" AND a<17 THEN
 LET a=a+3
 642 IF INKEY$="6" AND d>3 THEN
LET d=d-3
 643 IF INKEY$="7" AND d<16 THEN
 LET d=d+3
 644 IF INKEY$="8" AND a>2 THEN
LET a=a-3
 649 LET c=c+1: IF c>=20 THEN GO
 TO 652: IF c>=10 THEN GO TO 651
:
 650 PRINT AT d,a;a$: GO TO 654
 651 PRINT AT d,a;b$: GO TO 655
 652 PRINT AT d,a;c$
 655 IF INKEY$="0" THEN GO TO 60
00
 700 BEEP .5,10
```

RD HARTLEY of Southend-on-Sea, Essex, has owned a Spectrum for only two months, yet he has already produced a publishable program.

You are in the gun turret of a Federation starship. A squadron of enemy fighters is seen approaching. Your task is to blast them before you come within range of their guns.

Full instructions are given with the game, but you will find it extremely difficult to manoeuvre the enemy to the focus point of your twin laser guns and see the resulting explosion.

Graphics notes:
605 — Graphic A, graphic T, graphic I and graphic E.
7000 — Graphic R.




```
 800 LET rf=rf+1
 810 IF rf<30 THEN GO TO 900
 820 FOR x=6 TO 0 STEP -6
 830 PLOT a*8+10,175-d*8: DRAW I
NK x;40,-36
 840 NEXT x
 850 BORDER 2: PAPER 2: CLS
 860 PRINT INK 6;AT 8,6;"LASER D
ESTROYED": PAUSE 300: PAPER 7: C
LS : RUN
 900 PRINT AT d,a;"    "
1000 GO TO 620
5000 REM firing lazer
6000 REM shoot
6105 FOR n=6 TO 0 STEP -6
6110 PLOT 7,24: DRAW INK n;125,6
8
6120 PLOT 248,24: DRAW INK n;-11
6,68
6125 NEXT n
6127 BEEP .5,60
6130 IF a=15 AND d=10 THEN GO TO
 6134
6133 GO TO 656
6134 GO SUB 7000
6135 LET sc=sc+1: PRINT AT 20,25
;sc: LET rf=0:
6136 IF sc>=10 THEN GO TO 9500
6137 LET c=0
6140 GO TO 600
7000 LET z$="S":
7010 FOR n=6 TO 0 STEP -6
7015 PRINT INK n;AT 10,15;z$
7020 FOR p=1 TO 4
7025 BEEP .05,p*10
7030 PRINT INK n;AT 10+p,15+p;z$
;AT 10-p,15-p;z$;AT 10+p,15-p;z$
;AT 10-p,15+p;z$;AT 10,15+p;z$;A
T 10,15-p;z$;AT 10+p,15;z$;AT 10
-p,15;z$
7040 NEXT p: NEXT n
7045 RETURN
8000 FOR a=0 TO 7: READ d: POKE
USR "A"+a,d: NEXT a
8500 DATA BIN 0,BIN 01000010,BIN
 10011001,BIN 11111111,BIN 10011
001,BIN 01000010,BIN 0,BIN 0
8510 FOR a=0 TO 7: READ d: POKE
USR "T"+a,d: NEXT a
8520 FOR a=0 TO 7: READ d: POKE
USR "I"+a,d: NEXT a
8530 FOR a=0 TO 7: READ d: POKE
USR "E"+a,d: NEXT a
8600>DATA BIN 11100000,BIN 11000
000,BIN 11000000,BIN 11111111,BI
N 11111111,BIN 11000000,BIN 1100
0000,BIN 11100000
8605 DATA BIN 0,BIN 01111110,BIN
 01111110,BIN 11111111,BIN 11111
111,BIN 01111110,BIN 01111110,0
8610 DATA BIN 00000111,BIN 00000
011,BIN 00000011,BIN 11111111,BI
N 11111111,BIN 00000011,BIN 0000
0011,BIN 00000111
8650 FOR a=0 TO 7: READ d: POKE
USR "R"+a,d: NEXT a
8655 DATA BIN 01000000,0,BIN 011
00010,BIN 00100001,0,BIN 0001100
0,1,BIN 10000101
8999 RETURN
9000 STOP
9500 PRINT AT 9,5;"ALIENS DESTRO
YED"
```



STUNT RIDER

STUNT RIDER is a games program for the 16K Spectrum in which you are invited to risk life and paintwork by leaping your motorcycle over a row of buses.

You will start with eight buses and each successful leap will increase the number by one to the maximum number you have chosen. Pressing P makes the motorcycle accelerate and Q will slow it down. Your speed has to be correct to enable you to jump the buses without crashing.

If all the buses are jumped up to the number chosen by the user, he will be congratulated by an appropriate tune and his score given. There is also a timer. Enter RUN 9000 and then RUN.

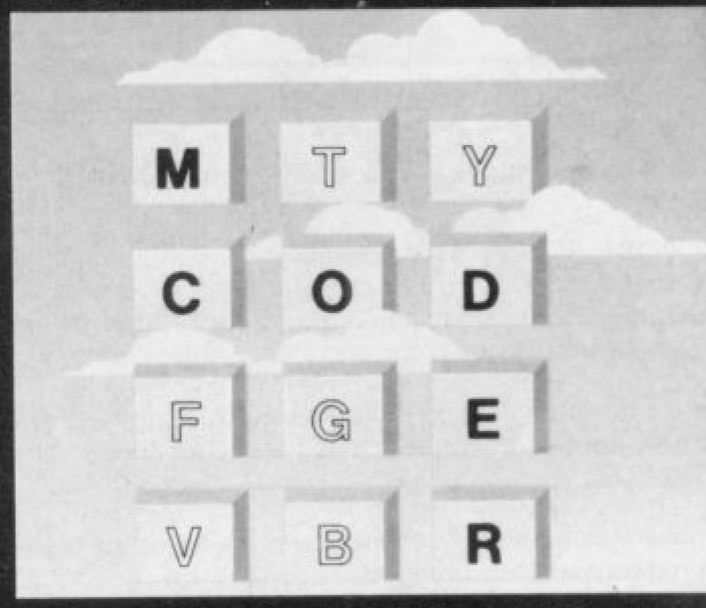
Stunt Rider was sent by J Mayers of London N20. Graphics notes: 50 — Graphic Ds; graphic C. 60 — Graphic A, graphic B. 120 — Graphic E. 550 — Graphic A, graphic B — both entered in inverse video — 620 — Symbol Shift 2.

```
   2 GO SUB 5000
   3 LET high=0
   4 LET htime=1000
   5 POKE 23693,56: BORDER 7
  10 OVER 0: BORDER 1: PAPER 1: INK 7
  12 CLS
  15 DIM y(3): RESTORE
  17 FOR z=1 TO 3: READ p: LET y(z)=p
  18 NEXT z
  19 DATA 6,5,5
  20 LET time=0
  30 LET speed=0
  35 LET bus=8
  50 LET b$="████████": LET r$="◢"
  60 LET m$=" ▄▟ "
  70 LET x=6: LET y=2
  80 CLS
 100 PLOT 0,149: DRAW 255,0: PLOT 0,101: DRAW 255,0: PLOT 0,61: DRAW 255,0: PLOT 0,21: DRAW 255,0
 110 PRINT AT y,x;m$
 120 PRINT AT 18,5; BRIGHT 1;r$; INK 2; PAPER 6;b$; PAPER 1; INK 7; BRIGHT 1;"◣"
 290 LET z=0
 300 IF INKEY$="" THEN GO TO 300
 310 LET speed=.2
 320 IF INKEY$="p" THEN LET speed=speed+.1
 321 IF INKEY$="P" THEN LET speed=speed+.1
 330 IF INKEY$="q" THEN LET speed=speed-.1
 331 IF INKEY$="Q" THEN LET speed=speed-.1
 335 IF speed<.6 THEN LET speed=.6
 337 IF speed>2.8 THEN LET speed=2.8
 340 LET x=x+speed
 350 PRINT AT y,x-speed;"   ";AT y,x;" ▄▟ "
 357 IF x>29-speed THEN LET z=z+1: PRINT AT y,x-3;"      ": LET y=y+y(z): LET x=1
 360 BEEP .01,speed-10
 370 LET time=time+.5
 380 PRINT AT 0,0; BRIGHT 1;"Time:";INT time;AT 0,14; BRIGHT 1;"Buses:";bus
 390 IF ATTR (y,x+1+speed)=79 THEN GO TO 500
 391 IF ATTR (y,x+1+speed)=114 THEN GO TO 500
 490 GO TO 320
 500 PRINT AT y,x-2;"     "
 505 PRINT AT 18,5;"◢"; INK 2; PAPER 6;b$; PAPER 1; INK 7; BRIGHT 1;"◣"
 510 LET y=16
 520 FOR q=6 TO 6+speed*10: BEEP .05,1: PRINT AT y,x;" ▄▟ ": LET x=x+1: NEXT q
 530 IF x<7+bus OR x>11+bus THEN GO TO 600

 540 PRINT AT y,x;"  ": LET y=18
 550 FOR q=x TO 29: PRINT AT y,x;" ▛▜": BEEP .05,25: LET x=x+1: NEXT q
 560 GO TO 800
 600 PRINT AT y,x;"  "
 610 LET y=y+1
 620 PRINT AT y,x;"  ";AT y+2,x; FLASH 1;"@#!"
 630 BEEP .5,5: BEEP .5,2: BEEP .2,7: BEEP .6,5: BEEP .6,2
 670 GO TO 900
 800 IF bus=b1 THEN GO TO 8000
 805 LET bus=bus+1
 810 LET b$=b$+"█"
 850 GO TO 70
 900 POKE 23693,56: BORDER 7: CLS
 910 PRINT AT 0,6; FLASH 1;"BAD LUCK!!";AT 2,6;"YOU CRASHED!!!"
 915 LET bus=bus-1: IF bus=7 THEN LET bus=0
 930 PRINT AT 7,5;"You jumped :";bus;AT 9,5;"In a time of :";time
 940 IF bus>high THEN LET high=bus: LET htime=time
 945 IF bus=high AND time<htime THEN LET high=bus: LET htime=time
 950 PRINT AT 12,5; BRIGHT 1;"High Score:";high;AT 14,5;"In a time of ";htime
 990 INPUT "Another go? ";a$
 991 IF a$="y" THEN GO SUB 5000: GO TO 10
 992 STOP
 999 STOP
1000 POKE 23693,56: BORDER 7: CLS
1001 PRINT AT 0,5; FLASH 1;"YOU'VE DONE IT!!!"
1020 GO TO 930
5000 CLS : PRINT AT 0,5;"Stunt ride";AT 1,5;"___________"
5010 PRINT AT 6,5;"P-To accelorate";AT 8,5;"Q-To slow down"
5020 PRINT AT 21,0;"Up to how many buses ?"
5030 INPUT "(9 TO 17) ";b1
5035 IF b1<9 OR b1>17 THEN GO TO 5030
5040 RETURN
8000 DATA 0,3,2,3,4,3,5,5,0,6,5,3,4,3,5,3,7,5,2,6
8010 DATA 5,3,4,3,5,3,9,3.5,7,1.5,7,4,5,3,5,3,4,3,2,4.4,4,5,5
8020 RESTORE 8000
8030 FOR x=1 TO 22: BORDER INT (RND*7): PAPER INT (RND*7): CLS : READ b,a: BEEP a/10,b: NEXT x
8040 GO TO 1000
9000 DATA "a",0,0,0,63,31,119,86,112
9010 DATA "b",240,16,32,224,192,112,80,112
9020 DATA "c",1,3,7,15,31,63,127,255
9030 DATA "d",127,65,65,127,127,85,127,36
9040 DATA "e",128,192,224,240,248,252,254,255
9099 RESTORE 9000
9100 FOR s=1 TO 5: READ a$
9110 FOR x=0 TO 7: READ z: POKE USR a$+x,z: NEXT x
9120 NEXT s
9999 RETURN
```

Personal Software Services makes *M*achine Code Redundant!

Now there is no need to spend long tedious hours writing and debugging your programs in laborious machine code - let MCoder from PSS do all the hard work for you....



MCoder is the first real integer compiler for The Sinclair Spectrum. This very sophisticated piece of software will simply translate basic programs into machine code for you, giving an average speed improvement of the order of 75 times although in certain cases the improvement can be as much as 900 times faster.

MCODER WAS DESIGNED TO BE AS SIMPLE AS POSSIBLE TO USE....

1. Load MCoder.
2. Write or load your basic program as normal.
3. RUN and debug your basic program
4. Compile your program using a single print USR command. If you have made a mistake MCoder will tell you exactly where, allowing you to correct it before it is too late.

As an additional feature basic programs can be compiled and "Stacked" above each other in memory - giving you true flexibility in your programming.

MCODER FOR THE SPECTRUM (16K or 48K) Costs only **8-95**

THE ZX81 VERSION IS ONLY **7-95**

Enter The PSS *COMPETITION

To show our faith in our product we are offering £1000·00 in prizes for the best Spectrum programs using MCoder. They can be GAMES, EDUCATIONAL, UTILITIES, in fact anything you care to write — The only restriction we make is that they must be written using MCoder.

1st. prize - £500

2nd. prize - A PORTABLE COLOUR TV VALUED AT £250

10 runners up - WILL EACH RECIEVE A PRIZE OF £25

WE ALSO GUARANTEE TO MARKET THE TWO WINNING PROGRAMS UNDER A ROYALTY AGREEMENT WITH THE AUTHOR. * CLOSING DATE 31st MAY. RESULTS WILL BE PUBLISHED IN SINCLAIR USER MAGAZINE. ENTRY FORM ENCLOSED WITH EVERY COPY OF MCODER.

QSave....now improved for '83. £15-95

MANY THOUSANDS OF SATISFIED CUSTOMERS NOW HAVE A HIGHLY RELIABLE LOADING SYSTEM WHICH OPERATES 16 TIMES FASTER THAN THE SINCLAIR SYSTEM. This is what you get:

1. A cassette interface to improve the signal quality (essential if a high speed loader is to be reliable) which will also improve the loading of your programs. The interface plugs into your ZX81 using the leads supplied and has been improved to incorporate: AN AUTOMATIC LEVEL CONTROL . . . AN OVERLOAD WARNING LIGHT . . . A SAVE/LOAD SWITCH (no unplugging of mic or earphone leads) . . .AN ON/OFF SWITCH (which doubles as a Reset switch). With these features loading is highly reliable (programs will still load with a volume setting as LOW as ¼).

2. Highly sophisticated software which will load and Save programs at 16 times their normal speed (i.e. 8K in 10 secs; 48K in 110 secs). Programs can be named to allow a superfast file search through a tape. It works equally well with autorun programs, Basic or machine code. A TRUE verify feature is also provided – this allows you to verify that a 'SAVE'd program has 'SAVE'd properly BEFORE turning off the power and finding all is lost.

QSAVE will operate with ANY memory, on ANY program length AND with your existing programs.
All the above is contained in ½K of superbly easy to use Software.

PSS
PERSONAL SOFTWARE SERVICES
452, Stoney Stanton Road, Coventry CV6 5DG.
Telephone: (0203) 667556



HOW TO SAVE POUNDS WHILE YOU LOSE POUNDS!

Here's your first-ever opportunity to save money while you lose weight: we're offering a **£2 reduction** on the sensational new Personal Weight Control Program to run on your ZX-81 or Spectrum!

It's great fun for you, your family — or a fat friend!

A really 'menu-driven' program!

You feed in data on what you eat and when . . . what weight you are and what you'd like to be. The program takes account of your preferences and your moods. Then it assesses the meal plan that takes care of your nutritional needs. *You* build your menus from the program's recommendations for a balanced diet.

Have fun with the feedback – while beating the bytes!

The sure way to weight-watching success is to work with regular feedback that reports on your progress. And the Personal Weight Control Program does just that — encouraging you towards your goal. It helps you beat those random bites by finding out *why* you're not eating properly. Then it suggests ways to combat the compelling urge to 'snack'.

Why not get your family involved? It combines fitness and fun in an original use for your ZX-81* or Spectrum.

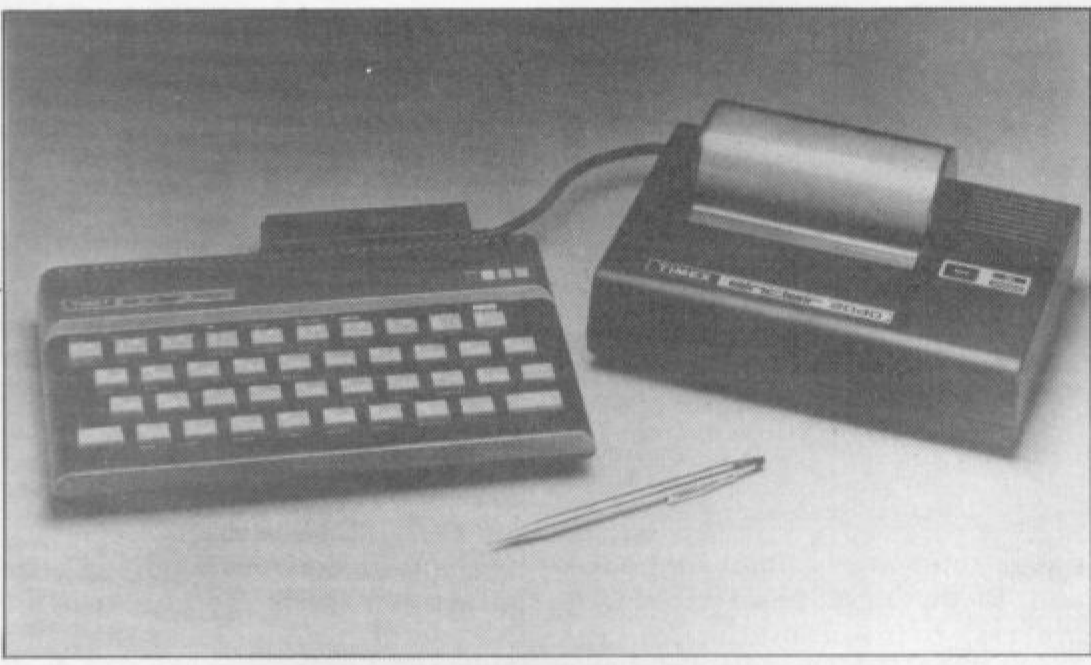
Send now to make sure of your £2 discount!

**NB: Needs 16K RAM.*

Send to: **"SAVE POUNDS OFFER", Sinclair User, 30-31 Islington Green, London N1 8BJ**
Please send me _______ Weight Control program(s) **at a saving of £2 each!**

ZX81 version — normally £13.95, **Special Offer price £11.95!** ☐
Spectrum version, normally £14.95, **Special Officer price £12.95!** ☐
I enclose a cheque/postal order made payable to Sinclair User for £_______
Please charge to my Access/Barclaycard*no_______
***Delete as applicable**
Signature _______
Name Mr/Mrs/Miss_______
Address_______

Offer applies to UK Readers only. Allow 28 days for delivery



Robin Bradbeer reports from the U.S. on the latest developments in the market

Timex upgrades Spectrum

TIMEX, the company which manufactures the ZX-81 and Spectrum in the U.K. and which has the right to market Sinclair projects in the U.S. and Canada, announced the launch of the U.S. version of the Spectrum at the recent Consumer Electronics Show in Las Vegas.

The TS2000, as it will be known, is an upgraded version of the Spectrum. Timex has taken the original Spectrum ROM and is in the process of re-writing it, taking out most of the bugs which have been identified by people like Ian Logan in the U.K.

At the same time, a number of Basic commands have been taken out of the ROM and, therefore, off the keyboard. For example, ATN, ACS and ASN have been removed, as have IN and OUT and the £ sign. A number of new functions will appear on those keys, including AUTO line number, RENUMber, line delete and a number of useful editing functions.

At the same time Timex plans to provide another port on the side of the Spectrum which will take ROM cartridges of between 4K and 32K. Those cartridges will contain games programs, business software and the like. It will allow software to be entered without needing a cassette player. Timex also announced a new printer for both the ZX-81, or TS1000 as its known in the States, and the Spectrum. The size of the printer, known as the TS2040, is slightly larger than the ZX printer. Instead of using electrically-coated paper, however, the TS2040 uses a thermal print mechanism. That is much quieter and far easier to read than the mechanism used on the ZX printer.

The prices of the 16K and 48K versions of TS2000 are $149.95 and $199.95 respectively. The ROM-based cartridges will sell for $29.95 each and the price of the TS2040 printer is $99.95.

Timex has also announced that it is reducing the price of the TS1000 which, unlike the ZX-81, has 2K of RAM as standard, to $84 for the next three months. That $15 reduction in the retail price brings down the TS1000 to approximately the same price as the ZX-81 in the U.K.

The pricing differential between the U.K. and the U.S. is much greater when the prices of the Spectrum and the TS2000 are compared. The 16K TS2000 at $149.95 is equivalent to £93.70 at the current rate of exchange and the 48K version is £124.96. As that is for an enhanced version of the Spectrum, it is possible to speculate that there may be a corresponding price reduction in the U.K. in the near future.

Timex has so far sold more than 600,000 TS1000s in the last nine months in the U.S. alone. The machine now accounts for something like 26 percent of the total number of home computers in the States. At the Consumer Electronics Show, Commodore showed, in a very flashy glass booth, its one-millionith Vic 20. The claim that it was the first computer to be produced in such quantities was disputed vigorously both by Clive Sinclair and Dan Ross, his opposite number at Timex. They claimed that more than one million ZX-81/TS100s had been sold by last November.

Sinclair Research had a separate stand at the exhibition and announced formally to the Americans the introduction of the Microdrive, Expansion Module and Prestel adaptor. All those peripherals were said to be available during Spring of 1983. The company also announced, for later introduction, a proportional spacing software program which will allow for a 64-character-per-line display. That heralds the addition of word processing capability.

> 'New printer is quieter and far faster than the ZX-printer'

A number of companies have set up in the U.S. selling British software. One is Mindware, a manufacturer of peripherals and software for the Timex-Sinclair computer system, and a U.S. distributor for an extensive library of business, engineering, programming and games software titles. The titles have been re-published, with new packaging and documentation appropriate for mass merchandising channels.

continued on page 84





continued from page 83

Many software distributors were envious of the fact that British software could be sold in a simple plastic case with a paper or card insert. The Americans like things in bright, flashy and rather large packaging. That adds about 50 pence to the cost of the software and as it sells for the same price as in the U.K. it means less profit.

Mindware has announced an enhanced version of its MW-100 plain paper printer. The new model, the Sidewinder, is a dot matrix printer which can reproduce material up to 132 characters wide. It also prints in several other modes, including 16-character wraparound and a 32-character line-for-line printout of the Timex-Sinclair screen display. The full screen display is 32 characters wide by 22 lines deep.

The MW-100 was designed to use standard 1¾in. adding machine paper tape and ribbon cartridges and is the only plain-paper dot-matrix printer made for the Timex/Sinclair. The MW-100 has a suggested retail price of $139.95.

Softsync is the biggest independent producer of software for the TS1000. When the ZX-81 began to be sold in the U.S., Softsync had tailor-made programs for the Timex line of software. By the time it was on the retailers' shelves it had an exciting line of software of its own.

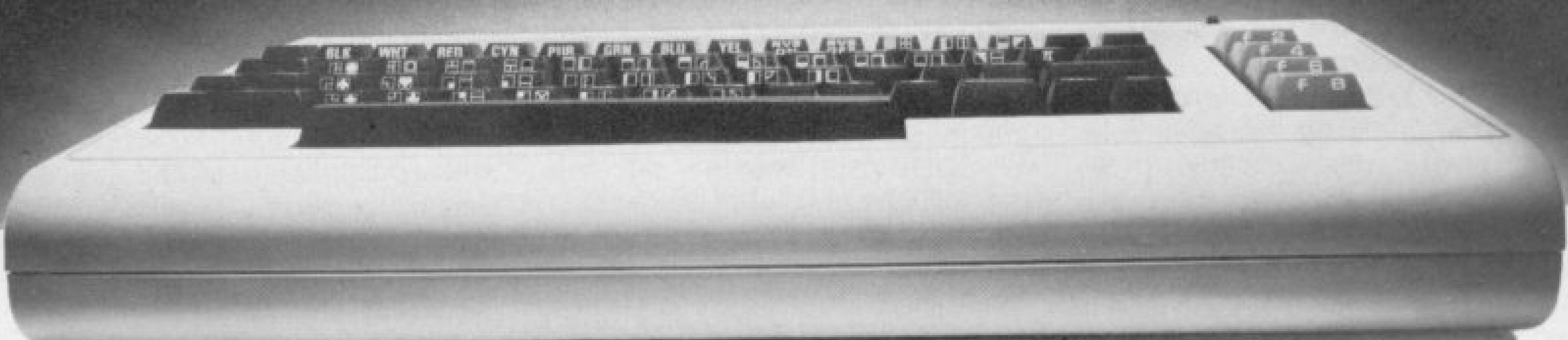
Softsync announced new program releases at the show such as the master chess game, educational programs and new arcade-style computer games.

Another company, Orbyte, has produced a range of six new programs for the small business, including Execu-Diary and Execu-Address and a telephone file called Execu-Soft.

Finally, the Far East is beginning to make Sinclair lookalikes. The Futura 8300 being distributed in the U.S. by Unisonic looks like the Spectrum but is basically a ZX-81. It runs Sinclair software, takes Sinclair peripherals, and is the same price as the Sinclair.

With its rubberised keyboard, like the Spectrum, it could be the forerunner of a series of lookalikes. Sources inside Sinclair do not take the threat lightly and any unauthorised copies such as this will be "dealt with". Apple has been hunting vigorously the 30-odd Taiwanese companies producing Apple at one-third the U.S. price and we can expect Sinclair to start doing the same.

It may repel extra-terrestrials, but can it switch on the light in the loo?



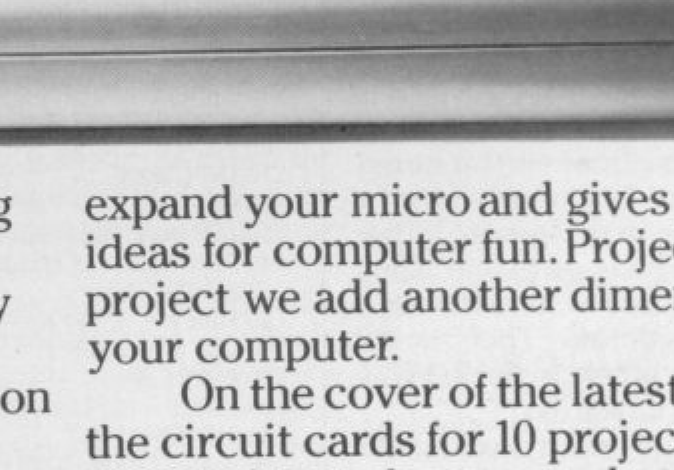
If you're getting bored playing games and running simple programs Electronics and Computing Monthly can show you how to put a lot of fun back into your micro. With the addition of some easy-to-build electronic circuits, your computer could drive much more than a TV screen.

Like your Scalextric, or train-set. It could control the lights in your house, the central heating system, talk to the budgie while you're out and water the houseplants when you're away.

And you can build all these things yourself-the simple circuits for pennies rather than pounds. Each month Electronics and Computing magazine shows you how to expand your micro and gives you new ideas for computer fun. Project by project we add another dimension to your computer.

On the cover of the latest issue are the circuit cards for 10 projects, and on the inside we show you what you can do with them. All you need is a hot soldering iron and a cool 75p.

WHERE ELECTRONICS AND COMPUTING INTERFACE



At your newsagent from Feb 12th.



Andrew Hewson considers a number of problems involving the use of graphics on both the ZX-81 and the Spectrum

Getting larger characters by using a Basic program

CAN ZX-81 characters be printed using POKEs to make them bigger and easier to read? That is what John Kerr of Rochester, Kent asks.

The answer is that there is a method, although it is not necessary to use POKE. The Basic program in table one PRINTs a character at eight times its normal size. The program is rather slow but it serves to illustrate the technique.

Both the ZX-81 and Spectrum construct characters by inking-in relevant squares in an 8×8 grid. No squares are inked-in for the space character, for example, and a star-shaped group of squares is inked-in to form the asterisk. An 8×8 grid is used because the form of each horizontal strip of squares can be stored using the eight bits which form a byte by inking-in a square if the corresponding bit is set to one. Thus eight bytes are used to store the form of each character. The ZX-81 character table is held in the ROM at locations 7680 onwards.

The program works by setting the variable A to the address of the first byte of the character selected by the user. Lines 150 to 270 are the beginning and end of a loop which cycles through each of the eight bytes in turn. The contents of the current byte are loaded into variable B and then compared to 2**7, 2**6, 2**5 and the like in turn.

That is equivalent to testing each of the eight bits. If B is greater than or equal to 2**I, the corresponding bit is set and so the program PRINTs a character. If B is less than 2**I, a space is PRINTed instead. Thus an image of the character is constructed which occupies not one but 8×8 PRINT locations.

The Basic program is rather slow to execute and so I have written the machine code routine listed in table two to do a similar task on the 16K ZX-81. The routine can be loaded using a simple hex loader, for example:

```
10 REM AT LEAST 46
   CHARACTERS
20 FOR I = 16517 to 16552
30 INPUT Z$
40 IF Z$ = "S" THEN STOP
50 PRINT Z$;" ";
60 POKE I,16* CODE Z$ +
   CODE Z$(2)-476
70 NEXT I
```

The REM statement must contain at least 46 characters because the

```
100 PRINT "ENTER A CHARACTER"
110 INPUT Z$
120 CLS
130 LET A = 7680 + 8* CODE Z$
140 PRINT Z$;" IS HELD AT
   ";A;"TO";A+7
150 FOR J = A TO A + 7
160 LET B = PEEK J
170 PRINT B,
180 FOR I = 7 TO 0 STEP -1
190 LET E=2**I
200 IF B-E THEN GOTO 240
210 PRINT Z$;
220 LET B=B-E
230 GOTO 250
240 PRINT CHR$ 0;
250 NEXT I
260 PRINT
270 NEXT J
```

Table 1. ZX-81 program to PRINT a character at eight times its normal size.

machine code routine is 43 bytes long and it uses another three bytes to hold variables. To load the routine run the hex loader and enter each pair of hex character codes in turn.

To use the routine, retain line 10 of the hex loader and enter the following:

```
20 PRINT "ENTER A
   CHARACTER"
30 INPUT Z$
40 CLS
50 LET A = 8* CODE Z$
60 POKE 16514,          A-
256*INT(A/256)
70 POKE 16515,
   INT(A/256)
80 POKE 16516, CODE Z$
90 RAND USR 16517
100 PAUSE 32768
110 CLS
120 GOTO 20
```

Paul Cooksley, of Dursley, Glos., has a Spectrum. He writes: **When I enter POKE 23607,50 the whole character set becomes spotty squares. Why?**

The chapter on the system variables of ZX Spectrum Basic Programming shows that location 23607 contains one fewer than the high byte of the address of the Spectrum character table. The character table is held at 15616 and so locations 23606 and 23607 normally contain 0 and 60 respectively because

0+256*(60+1)=15616

Thus, noting that the first true character in the Spectrum character set has CODE 32 not CODE 0 as on the ZX-81, the ZX-81 program in table one can be adapted to run on the Spectrum by substituting

```
130 LET A = PEEK 23606+256*
    PEEK 23607 +8* CODE Z$
```

It is also necessary to alter lines 190 and 240 as follows:

```
190 LET E = 2 ↑ I
240 PRINT CHR$ 32;
```

POKEing a new value into 23607 causes the Spectrum to look in a new place for the eight bytes which determine each character leading to the spotty squares effect which



Cooksley noticed. The same effect can be generated on the ZX-81 because the high byte of the address of the character table is held in the I register. A short machine code routine can be used to alter the value in I as in this program sent by Roger Milton of Bristol:

```
1  REM YO GOSUB? TAN
10 POKE 16517,71
20 INPUT A
30 POKE 16515,A
40 RAND USR 16514
50 IF A « 30 GOTO 20
```

The GOSUB and TAN in line one must be entered as tokens. To achieve that enter the line in reverse order, i.e.

TAN b GOSUB?bb 1 REM YO

where "b" represents back-space. The program transfers the value entered by the user to the I register and the spotty squares effect results. If the correct value is entered (30) the program halts.

Unfortunately it is not possible to use values greater than 63 which would point into the RAM area because the ZX-81 hardware misinterprets the resulting address. The only effect is to generate black or white squares.

Hex code	Assembler Code	Comment
21 00 1E	LD HL, 7680	Address of table to HL
ED 4B 82 40	LD BC, (16514)	8*character code to BC
09	ADD HL, BC	
EB	EX HL,DE	
2A OC 40	LD HL, (D-FILE)	Address of display to HL
23	INC HL	
06 08	LD B,8	Set byte counter
C5	PUSH BC	and save it
06 08	LD B,8	Set bit counter
1A	LD A,(DE)	Byte to A
17	RLA	Left bit to carry
30 06	JRNC, + 6	Bit set?
F5	PUSH AF	Yes, save A
3A 84 40	LD A,(16516)	Print character
77	LD (HL),A	
F1	POP AF	Restore A
23	INC HL	
10 F4	DJNZ,-12	Finished byte?
C1	POP BC	Yes
10 01	DJNZ + 1	Finished?
C9	RET	Yes
C5	PUSH BC	No
01 19 00	LD BC,25	Move print
09	ADD HL,BC	position to
13	INC DE	next line
18 E5	JR — 27	and take next byte

Table 2. ZX-81 routine to PRINT a character at eight times its normal size.

One of the many extra features of the Spectrum is the facility to VERIFY tape copies of programs or data. **Is it possible to verify the screen display?** asks Michael Moses of Leeds.

VERIFYing the display should be straightforward using the commands

VERIFY " " SCREEN$

or as an equivalent

VERIFY " " CODE 16384,6192

Unfortunately the ROM routine which searches the cassette PRINTs the name of the cassette file to be VERIFYed on the screen, thereby corrupting the Spectrum copy of the display.

There are two solutions. The first is to copy the display to an area above RAMTOP and VERIFY the copy of the display. That technique has the added advantage that the display can be restored from above RAMTOP if required.

The routine in table three copies the display above RAMTOP, SAVEs and VERIFYs the copy and restores the display on completion. It is written to run on the 48K machine. To run it on the 16K Spectrum, change 229 in each of the DATA statements to 101 and change 58624 in lines 290 and 310 to 25856. Space must be reserved above RAMTOP before the display is generated by entering

CLEAR 58624

on the 48K machine or

CLEAR 25856

on the 16K machine.

The routine works by loading two short machine code routines into the printer buffer from the DATA statements. The two routines copy and restore the display respectively by setting the HL register pair to the address to be copied from; the DE register pair to the address to be copied to; and the BC register pair to the number of bytes to be copied — in this case 6912. The LDIR instruction then moves each byte in turn.

```
9800 RESTORE
9810 DATA 33,0,64,17,0,229,1,0,27,237,
  176,201
9820 DATA 33,0,229,17,0,64,1,0,27,237,
  176,201
9830 FOR i = 23296 to 23319
9840 READ a
9850 POKE i,a
9860 NEXT i
9870 RANDOMIZE USR 23296
9880 CLS
9890 PRINT "Save copy on tape"
9900 SAVE "Display" CODE 58624,6912
9910 PRINT "Rewind tape for
  verification"
9920 VERIFY "Display" CODE 58624
9930 RAMDOMIZE USR 23308
```

Table 3. A routine to SAVE and VERIFY the display by copying it above RAMTOP.

The CLS command in line 9880 is redundant. Its only purpose is to

continued on page 90







continued from page 89

demonstrate that the routines are working correctly by clearing the display between copying and restoring it. The copy which has been SAVEd on tape can be LOADed in the usual way by entering

LOAD " " SCREEN$

The disadvantage of the routine is that a great deal of space — almost 7K — is used to store the display above RAMTOP, which leaves very little space on the 16K Spectrum for anything else. Table four presents an alternative which uses much less space because it stores only the parts of the display which are corrupted by the Spectrum cassette search routine. A special routine must also be used to LOAD the cassette copy.

The program works by copying the first 17 characters on line one of the display into the printer buffer — lines 9500 to 9560 — followed by the attributes of the 17 characters — lines 9570 to 9590. It then PRINTs on the display the message which the Spectrum cassette search routine will PRINT when it locates the cassette copy and SAVEs the display file, the attributes and the beginning of the printer buffer which can be used to restore the display to the correct condition. The routine then re-sets the PRINT position and VERIFYs the cassette copy — lines 9620 to 9630. Finally, lines 9640 to 9730 copy the contents of the printer buffer back to the display.

The VERIFY routine can also be used to LOAD the display by changing line 9630 to

9630 LOAD " " CODE 16384

It is important to note that the message PRINTed by line 9600 should be 17 characters long. Thus if the cassette copy is to be called "Display", three trailing blanks should be added after the word Display.

●*Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.*

```
9500 LET k = 0
9510 FOR i = 16416 TO 18208 STEP 256
9520 FOR j = 0 to 16
9530 POKE 23296+k, PEEK(i+j)
9540 LET k = k+1
9550 NEXT j
9560 NEXT i
9570 FOR i = 0 TO 16
9580 POKE 23296+i+k, PEEK (22560+i)
9590 NEXT i
9600 PRINT AT 1,0;"Bytes:Display"
9610 SAVE "Display" CODE 16384, 7065
9620 PRINT AT 0,0;
9630 VERIFY " " CODE 16384
9640 LET k = 0
9650 FOR i = 16414 TO 18208 STEP 256
9660 FOR j = 0 TO 16
9670 POKE i+j, PEEK (23296+k)
9680 LET k = k+1
9690 NEXT j
9700 NEXT i
9710 FOR i = 0 TO 16
9720 POKE 22560+i,PEEK (23296+i+k)
9730 NEXT i
```

Table 4. A routine to SAVE and VERIFY the display using the printer buffer.

ZX SPECTRUM ZX SPECTRUM ZX SPECTRUM

CENTRONICS printer/RS232 serial INTERFACE 2 INTERFACES IN 1

To complement the 'best computer in the World' we have developed a superb interface. A CENTRONICS parallel *AND* a bi-directional RS232 interface in the same box.
Professional applications are now in easy reach.

Line length limited only by printer
Uses standard PRINT/LPRINT/LIST/LLIST statements
High resolution graphics with EPSON and NEC printer
Will print anything from the screen in graphics mode
Compatible with SINCLAIR printer and most other add-ons
Easy to use. Supplied with demonstration software on cassette
Uses standard printer cable available as an extra
Handshaking provided for both ports
Full bi-directional RS232 link
Software selectable BAUD rates
50/110/150/300/600/1200/2400 BAUD
Fully assembled, boxed and tested

This interface uses the built-in operating system to simplify use giving a highly professional performance that will enable the SPECTRUM to be used for real applications, e.g., Word-processing, computer aided design, process control, intelligent V.D.U., etc, etc.

Easy to use
Line length limited only by printer
Uses inverse characters for lower case
Compatible with SINCLAIR printer, RAM packs etc.
Control codes can be sent to use your printer to the full
Firmware in ROM so LLIST and LPRINT functions always available
Will drive any printer with standard interface from your ZX-81
CENTRONICS and RS232 ports may be used to drive two devices together
Most popular BAUD rates available selectable by link
110/150/300/600/1200/2400/9600 BAUD
Handshaking provided for both ports
Fully assembled, boxed and tested with instructions manual

Word-processing and graphics software available soon.
S.A.E. for details.

ACCESS, BARCLAYCARD or CHEQUE/PO
Price £29.95 (+£4.50 VAT + £1.50 p&p. TOTAL: £35.95)

Please allow 10 working days for delivery

MOREX PERIPHERALS LTD (Mail order only)

Dept. SU2, Balliol Road, Caversham, READING. Berkshire.
Tel: (0734) 478854. Telex: 849911 MOREXG

EXPLORING SPECTRUM BASIC
Mike Lord's latest book takes the reader beyond the Sinclair Manual. It contains a wealth of programs and explanations of Spectrum BASIC programming techniques. Topics include writing games programs, personal, business and engineering applications, and utility programs. Worth far more than £4.95

THE EXPLORERS GUIDE TO THE ZX81
Mike Lord's acclaimed book for the ZX81 enthusiast. Includes games, business, engineering and utility programs for both 1K and 16K machines, an introduction to Machine Language, with a list of useful ROM routines, hints & tips, and hardware notes including RAM and I/O circuits. "of the greatest value" (ZX Computing review) £4.95

MASTERING MACHINE CODE ON YOUR ZX81
By Toni Baker; 180 pages of immense value to beginner and expert alike. £7.50

All prices include U.K. P & P – no VAT on books.
Overseas customers add £1.50 carriage per order.

TIMEDATA Ltd. Dept H
16 Hemmells, Laindon, Basildon, Essex
Tel: (0268) 418121

VISA

TIMEDATA

EDUCATIONAL SOFTWARE ZX81 (16K) & SPECTRUM

INTERMEDIATE MATHS 1: *(ZX-81 & 48K Spectrum)* 6 teach and test programs. Long Multiplication, Long Division, Highest Common Factor, Lowest Common Multiple, Fractions 1 (+ & −), Fractions 2 (× & ÷).

INTERMEDIATE MATHS 2: *(ZX-81 & 48K Spectrum)* 6 teach and test programs. Areas, Perimeters, Simple Equations, Percentages, Sets, Venn Diagrams.

INTERMEDIATE ENGLISH 1: *(ZX-81 & 16K Spectrum)* Meanings 1, Meanings 2 (harder), Parts of Speech, Proverbs, Similes, Anagrams.

INTERMEDIATE ENGLISH 2: *(ZX-81 & 16K Spectrum)* Idioms, Opposites 1, Opposites 2 (harder), Group Terms, Odd Word Out, Spellings.

"O" LEVEL FRENCH REVISION: *(ZX-81)* 3 teach and test Grammar programs, plus 3 comprehensive Vocabulary programs.

"O" LEVEL MATHS REVISION: *(ZX-81)*1 teach and test program, plus 2 programs using generated questions from the "O" level syllabus.

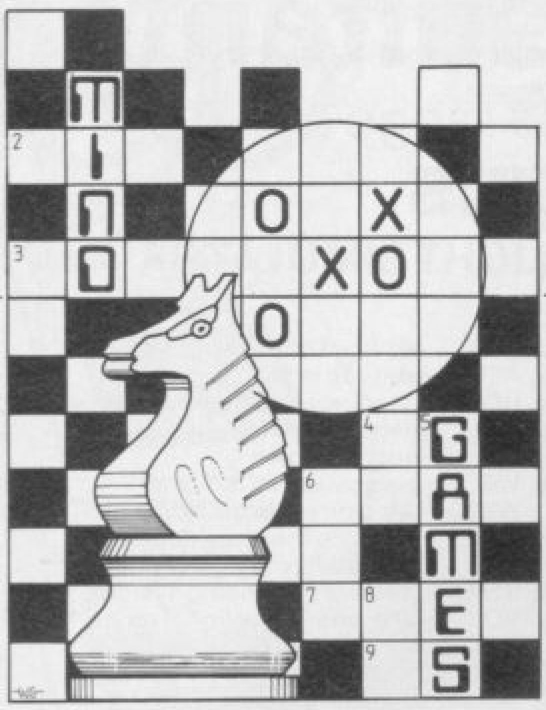
PRIMARY ARITHMETIC: *(ZX-81 & 16K Spectrum)* Add, Subtract, Multiply and Divide. Numbers are in large size type. 3 levels. Enter the answer with units first.

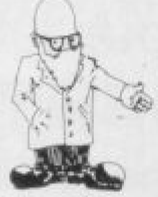
EDUCATIONAL QUIZ: *(ZX-81)* 4 programs for the family. Questions on General Knowledge, Reasoning, English and Maths. All questions use RND function.

Mark your order ZX81 or Spectrum.
£4.95 per cassette, or send s.a.e. for catalogue to:-
ROSE CASSETTES, 148 Widney Lane, Solihull, West Midlands B91 3LH

Our Software has received good reviews in "Sinclair User", "Your Computer" and "Educational Computing" and is included in the MUSE Library of Educational Software.

We are looking for good educational software.





Tolkein's tale has captured the imagination. Quentin Heath attempts to get to the ring but finds he wastes too much time

New cassette can be Hobbit-forming

SALES of **The Hobbit**, an adventure game for the 48K Spectrum, have been going very well, according to Melbourne House, the company which produces it.

It is one of the most complex games for the Sinclair machines I have seen and that is one of the reasons why it is selling so well. The plot follows closely that of Tolkien's book and there are added dangers to make it more interesting.

There are many objects in the game which cannot be used until certain situations have been passed or conditions met. They tend to take up a fair amount of time on this adventure. Much time can be wasted by checking objects which prove to be useless. For instance, many people who see the chest in the hobbit hole at the beginning of the game usually are tempted to look inside.

> 'It is one of the most complex Sinclair games I have seen'

The player may suspect that the chest contains weapons or armour but there is nothing inside. That may cause further consternation and a furious search. All that has happened to most victims of the game I know, including several people in the *Sinclair User* office. Usually a chest is for putting things into and at the beginning of the game there is nothing to store in the chest. The one thing to remember is that the most ordinary and unmysterious objects usually prove the most useful.

At all costs you must be practical, as examining objects which seem mysterious may lead you into the dark.

The Inglish language specially developed by the makers, which all the game's characters speak fluently, is causing problems for some people. Most of the time Gandalf and Thorin wander around saying 'Hurry up', 'What's this', or 'No' at the slightest provocation. You should not give up, though — experiment by talking to Thorin, Gandalf and Elrond. The information one of them will give you is certainly not misguided.

If you have managed to obtain more information from any of the characters, I would be interested to hear. In the early stages of the game it is best to follow one direction when going forward and that is explained in the Hints and Tips column. If in doubt, follow that direction and it will usually get you out of trouble.

There are some very odd moves which you can make during the course of the game. For instance, if you have a sword you could kill Elrond when you visit Rivendell. That is very easy to do but your blood lust could prevent you learning Elrond's secret. That may not seem very important at the time but it could make a difference to the outcome.

A sword is a basic piece of for any adventurer and can be of use against most foes, as well as Elrond. Your sword is provided for you in the early part of the adventure and it is a good idea to pass the trolls to get it. The secret of the sword is difficult to unlock but you must remember that problems are not half so bad in the daylight.

There are two other problems which adventurers in The Hobbit are meeting. The first is the maze in the misty mountains. If anyone has managed to get out alive I would like to know. The second problem is that the program sometimes crashes when you have battled your way through the Elven King's Halls, got into one of the barrels in the cellar and plunged into the underground river.

One correspondent has had that happen several times. The makers of the game believe that it is the fault of the particular tape copies.

Hints and tips — read only if desperate.

Go east when all else fails or north when past the mystic Elves.

A stone troll is the key to the door when day dawns.

Beware of pitfalls in Beorn's house.

Turn west at the wooded gate to the north.

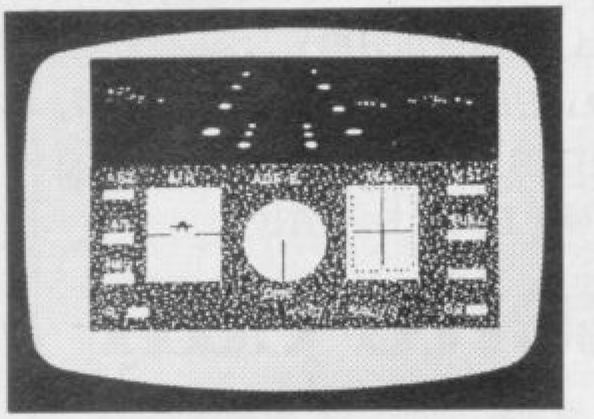
When pale eyes are about to sting, retrace your steps.

• *Philip Joy, author for 10 months, will no longer be writing this column and I have been asked to take over. It is intended to expand the areas covered. If you have views about mind games, including chess, adventure and computer-moderated games, I would like to hear from you. Also, if you have any hints or problems you would like to offer, send them to Mind Games,* Sinclair User, *30-31 Islington Green, London N1 8BJ.*

Hewson Consultants

We proudly announce our 1983 range of

SPECTRUM CASSETTES



NIGHTFLITE 16 and 48K FLIGHT SIMULATOR

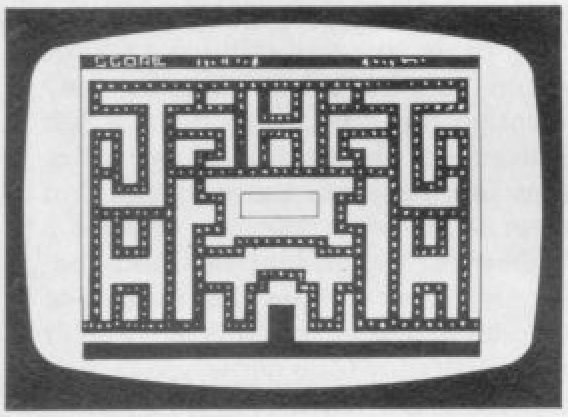
NIGHTFLITE puts you at the controls of a light aircraft flying at night. You can:
Climb, descend, take off,
Land, bank left or right,
Navigate between beacons,
Raise/lower the flaps,
Raise/lower the undercarriage,
Adjust engine rpm,
Raise/lower the nose varying amounts.
Runway lights appear on approach.
5 modes including Autopilot.
Written by a qualified light aircraft pilot.

A/H – artificial horizon
ALT – altitude in ft
HDG – heading in compass degrees
FL – flaps up/down
GR – gear up/down
VSI – vertical speed indicator
WIND – wind direction/velocity
DME – distance measure equipment
ADF – automatic direction finder
ILS – instrument landing system
VOR – VHF omni directional range

£5.95 our runaway best seller

Available through W H SMITHS and many independent micro-computer shops

COMING SOON:– **AIR TRAFFIC CONTROL** – Puts you in command at Heathrow Airport **£7.95**

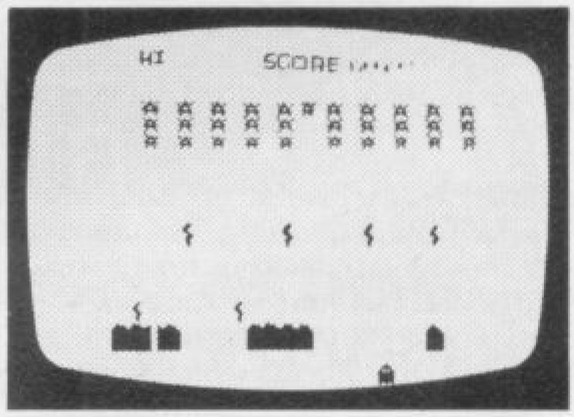


£4.95
All action game

MAZE CHASE
16 and 48K

4 or 8 Mazes, Highest score to date,
4 independent guardians, 3 lives,
Full colour, Fast machine code action,
magic strawberries, eat lemons
to score more, real time scoring.

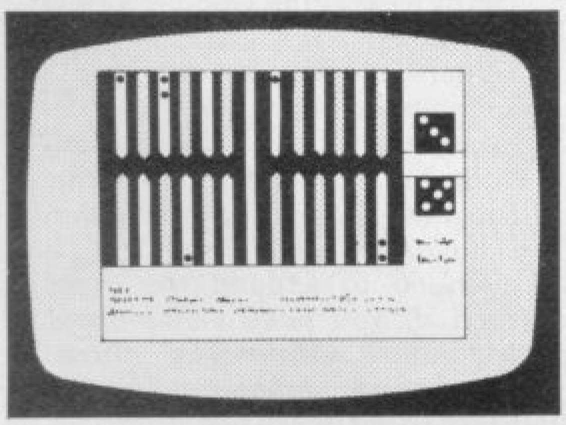
£4.95
Are you
fast enough?



SPECVADERS 16K

Defeat each squadron of Beeple Zaps and another appears only closer.
Cyrian mothership with ejecting Zeetle Baps.

5 levels of play from Orions snails pace to close your eyes and hope.
Real time scoring. 3 lives. Pan galactic gargle blaster for highest score.
Descending asteriods.



£5.95
A real challenge

BACKGAMMON 16K

8 Levels of play from novice to expert.
Full colour display of tables and dice.
Gamble on a single game or a series, double or quits. All the features of the ancient game.

£5.95
Another first



COUNTRIES OF THE WORLD

16 and 48K on one cassette
Countries of the World is an educational package designed to give an appreciation of the location of all the main countries and some information about them.
16K version displays a world map, shows the position of each country and names its capital.

48K version: all the above plus prints the population, size, currency, and main languages of each country, and statistics on largest and smallest countries etc.

PLUS: Two complete world map screen displays for you to include in your own programs.

Hewson Consultants

SPECTRUM BOOKS



Available through Computer Bookshops and W H SMITH.

40 BEST MACHINE CODE ROUTINES FOR THE ZX SPECTRUM £5.95

By Andrew Hewson and John Hardman

Section A: Three chapters explaining what you need to know about Z80 machine code on the Spectrum.

- How to load and save machine code.
- How to use the system variables.
- How memory is organised.
- How program lines are stored.
- How to use the stack, the display, the attribute files.
- How to call ROM routines – where they are and what they do.
- The structure of Z80 code – plus a valuable glossary.

Section B: 40 routines including,

- Scroll – up, down, side to side by pixel or by character.
- Search and replace, token swap, string search.
- Rotate character, invert character – horizontally and vertically.
- Line renumber – including GOSUBs, GOTOs, RUN etc.

This book teaches the beginner all he needs to know in a simple, easy-to-learn form and its an invaluable reference work for the expert too!

20 BEST PROGRAMS FOR THE ZX SPECTRUM £5.95

By Andrew Hewson

Program titles include:

Machine Code Editor – Write, modify, extend and load machine code using this all-basic program. No need to use an Assembler when you have this program.

Index File – Learn about fixed length records, save numeric and string information, add to, sort, modify, delete and print your records. Ideal as a computer based filing system.

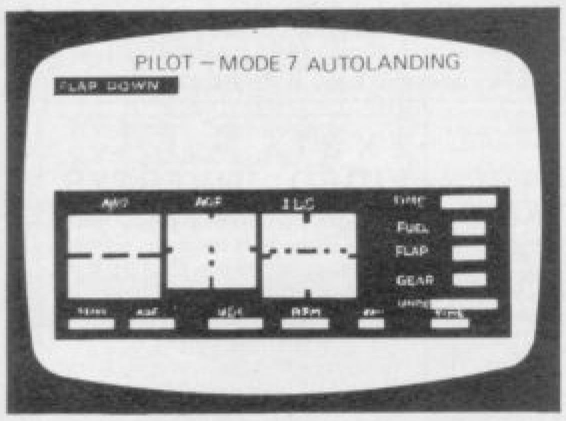
Duckshoot – Learn how to manipulate the attributes file *and* have fun at the same time.

Graphix – Construct up to 210 graphics characters with the full on-screen editing facilities, enhance and modify them and recall them later to build a detailed display to save on cassette.

Spiromania – A program to stretch your artistic talants, imagination and ingenuity. Draws a limitless variety of curves and spirals.

Plus: FOOTBALL, DIGITISER, DIARY and many more.

ZX81 BEST SELLERS



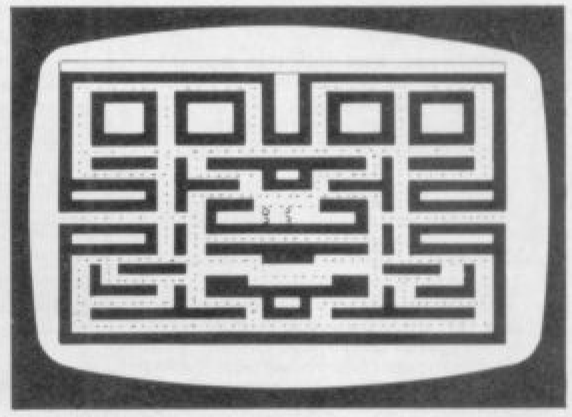
PILOT 16K (ZX81) £5.95

Fly your own aircraft.
Instruments and readouts:
A/H, ALT, HDG, FL, GR, VOR, VSI, WIND, DME, ADF, and ILS see "NIGHTFLITE". Essentially the same as "NIGHTFLITE" but without the Hi Res Graphics.



HINTS & TIPS FOR THE ZX81 £3.95

Passing data between programmes,
Calling subroutines from cassette,
Machine code programmes.
Bits, bytes, addresses and hexodecimal plus much more.



PUCKMAN 16K (ZX81) £5.95

3 Mazes.
Highest score to date.
4 Independent guardians.
Magic strawberries.
Real time scoring.

RETAILERS

We are continually on the look out for new outlets. if you are interested in stocking the items advertised here, write to us for our trade rates.

URGENT

We require high quality Spectrum and Dragon software. Good royalties paid. Send your samples today for fast evaluation.

THE PROGRAMS

The programs advertised here are available from computer bookshops with a software stand, and many independent micro-computer shops.

ORDER FORM

Make cheques/PO's payable to Hewson Consultants

Quantity	Product	Cost

Name ______ Total ______
(Block Capitals Please)

Address ______

______ Signed ______

My Access/Barclaycard No. is ______

Post to: **HEWSON CONSULTANTS**, 60A St Mary's Street, Wallingford, Oxon OX10 0EL.
Tel (0491) 36307.

sinclair supermart

PROGRAMMES FOR LEARNING

SPECTRUM programmes for schools and parents which have been RESEARCHED and TESTED by teachers. Subjects include — READING, SPELLING, ENGLISH (for 7-11 years inc. Common Entrance etc.) and MATHS (7 years to 'O' level). No data input is required just RUN the programmes.

For free registration and details please write to Dr Glasson, 94 Airedale Ave, Chiswick, London W4 2NN.

ZX-81 (16K)

Fast SAVE/LOAD program.

£5.50 incl. VAT and p&p. Up to 3.6K bit per second. (Approx. 15 × Sinclair speed), no tape level doubts — program tells you if level O.K. Uses standard Sinclair cassette port.

MUSAMY SOFTWARE
136 Brettenham Road
Walthamstow, London E17 5BA

NEW FROM P.S.E.

Games Tape 3 for the 16K/48K Spectrum comprises: All machine code real-time, 3-D game based on the films "STAR WARS" and "THE EMPIRE STRIKES BACK". Some of the best graphics and sounds yet seen on the Spectrum. 3 games in one. Also contains 3 games of logic: 3D noughts & crosses, Tower of Brahma, Wipe-out. All for only **£6.95 inc. p&p.**

Spectrum ROM disassembler — translates Sinclair's ROM into readable mnemonics. **£2.00 inc. p&p**

Games Tape 2: Fruit Machine, Battleships, Fighter Pilot, Night Fighter, Defender, Missile Command. ZX-81(16K) — **£4.95**, 16K/48K Spectrum — **£6.95 inc. p&p.**

Other game and educational software available. SAE for further details/up-to-date price list to:

Precision Software Engineering,
20 Shelton Ave., Newark,
Notts NG24 4NX.

NOW! COPY COMPUTER TAPE PROGRAMS FROM TAPE TO TAPE

Ideal for user groups who want to share their own programs without having to load and save through a computer. It will even copy machine code programs.

Unit plugs between earpiece of one cassette and microphone input of the other.

Unit is fitted with two 3.5mm jack sockets and is self powered with internal PP3 battery (not supplied). At present only for the ZX Spectrum. Soon to follow for the ZX-81.

Price £7.95p + 25p p&p.

Send cheque or PO to:
JILES ELECTRONICS
48 Parkway, Chellaston
Derby DE7 1QA.

SPECTRUM SOFTWARE

All programs menu-driven with colour and sound.

Pools Forecasting Aid: Take advantage of a statistical analysis of results since 1952 and the evaluation of those draw trends and cycles discovered. Direct-from-coupon input, review and print-out facilities. 16 or 48K.

Biorhythm: Taken seriously by many people. Based on scientifically accepted principles of 'life cycles', this program offers an accurate and comprehensive prediction of physical, emotional and intellectual levels of intensity. 16K only.

Cheques/PO's for £4.95 (16K) or £5.95 (48K) inc. p&p to: J. English, 10 Meadow Close, Shipdham, Thetford IP25 7NF.

ZX81/ SPECTRUM WORKSTATION

Provides a common platform and secure mounting with three power switches for computer, add ons, tape recorder, printer, power pack, computer cooling hatch. Hidden wiring and TV tilt. Prevents memory loss through jolts to system.

Price **£15.95 inc.**

BAKER M F
Unit 6, Woolsbridge Ind. Est.,
Three Cross, Dorset.

WORLD INFO

a database of information about the modern world. Readers of newspapers, students and teachers of Current Affairs, International Relations and Modern Studies need it.

Includes wars, areas of tension, top men, types of regime, alliances and much more.

For ZX-81. Full file on 32K; parts on 16K. Uses Campbell Systems THE FAST ONE..

Spectrum version in preparation.

£12 *from:*
WIMSOFT
20 Brookside Road, Wimborne,
Dorset BH21 2BL.

ANVIL COMPUTING

SUPERB NEW SELF TEACH PROGRAM

For ZX-81 (16K). Spectrum.
TRS80. Video Genie.

• Now you can learn basic fast and efficiently•

•Forget your past programming problems. This program will make it all clear•

Covers Arrays, Sorting, Searching, Counting, Decision making tests, Error Trapping, Menu driving etc. You start with short simple programs and build up to full working programs with everything explained in full, precise detail.

•This is *NOT* a program you simply copy and run.• •• *YOU HAVE GOT TO WORK!* •• But it is written in such a way that you can not get stuck.

This program has been fully tested over the past six months by 50 domestic and small business users and we have not received any adverse reports.

This program is our own product and is not available from any other source. Full money back guarantee. **£4.75** incl Postage & Package (state which computer).

51 Whitcliffe Lane, Ripon, Yorks HG4 2LB.

SPECTRUM 32K RAM *£24.50*

Upgrade your 16K Spectrum to 48K with our RAM kit. Only fits Issue 2 machines, identified by a large chip in a socket in line with the "9" key, visible through the rear expansion cutout. The kit consists of chips and instructions, and NO soldering is needed.

£24.50 incl. VAT and P&P.

HAPPY WITH YOUR DISPLAY?

Or have you got problems?

- Are your whites yellowish?
- Is every other line a different colour (like Venetian blinds)?
- Do your characters wobble? (Some character wobble is bound to exist, but it can be reduced).

We have prepared instructions to allow any Spectrum to give the best possible results, by adjusting internal controls.

Send £1 plus S.A.E. *(Sent free if you order the RAM.)*

FOUNTAIN COMPUTERS LTD., Darvill Road, Ropley, ALRESFORD, SO24 0BW.

ZX-81 16K. Adult users only. Free: complete financial analysis program on cassette. Send only two 22p postage stamps to: Brian Harding 9 Verdayne Gardens, Warlingham, Surrey CR23 9RP.

ZX-81 PROGRAMS

QUIZ LUDO (16K). An exciting game for all ages. Use our questions or enter your own. **£3.95**

UNITS (16K). Explore the world of units. Educational and useful. **£3.95**

PRE-SCHOOL CONCEPTS (1K). 6 programs to develop number skills, shape recognition and manipulative ability. **£3.45**

DISCOVERY FOR OVER FIVES (1K). 6 programs covering addition and subtraction, spelling and pattern formation. **£3.45**

On cassette, prices include instruction leaflets and p&p.

Dept. S2, Prolog Home Software,
22 Rectory Drive, Yatton,
Bristol BS19 4HF.

CHALLENGE . . . . AND PROFIT

POOLS PREDICTION

YOUR COMPUTER *CAN* HELP YOU WIN THE FOOTBALL POOLS

"By studying form scientifically you can considerably improve your chances of winning"
(Prof F. George — New Scientist March 1980)

THE DATA. . .

*Available for your analysis — the complete record of all English Football league games 1977-82 (10,140 matches)
*Not simply a win-lose-draw record but the **actual scores and dates** allowing sophisticated analysis.
*Simple numerical array format.
*Fully documented.
*Supplied with starter analysis programs.

Tapes: 5 years data £12.50;
2 years data £7.50
ZX81 (16K)/Spectrum.

Immediate dispatch from:
Selec Software, 37 Councillor Lane,
Cheadle, Cheshire. 061-428 7425.

ZX81 VIDEO INVERTER

Save your eyes. Increases save level. Displays sharp white characters on solid black background screen. Kit £4.00. Built £5.00. Includes VAT & P/P. As reviewed in *Popular Computing Weekly* August 26th. Send cheques/postal orders to:

D. FRITSCH
6 Stanton Rd., Thelwall,
Warrington, Cheshire WA4 2HS.

TRADITIONAL GAMES FOR YOUR SPECTRUM OR ZX-81.

Quiet! Sociable! Easy to play!

ROULETTE (Spectrum 48K) £4.95
Four players can place their chips on the Monte Carlo table in a variety of betting combinations. Good linear simulation of wheel. All wins are high lighted and bank accounts automatically computed and displayed.

GAMBLING TAPE (Spectrum 16K) £2.95
Fruit Machine — holds, nudges, gambling feature, Poker Dice and Slippery Sam.

CHILDRENS COMPENDIUM
(Spectrum 16K) £4.95
(ZX-81 16K) £2.95
Ludo, Snakes & Ladders, Beetle. Up to 4 named players.
Noughts & Crosses and Fox & Geese. Where you can play your friends or the computer.

Roulette & Gambling Tape £6.95
All 3 Spectrum programs £9.95
All prices include p&p.
Money back guarantee.

DYMOND SOFTWARE
Dept. SU, Hospital Road,
Annan DG12 5HP, Dumfriesshire.

16K ZX-81, + manual, leads etc. — guaranteed, + 7 cassettes, Scramble, Defender, Breakout, with more on tapes. The lot worth over £100, bargain for £80 o.n.o. 061-795 5059 (Manchester).

For ZX-81 from IVOR KILLERBITE

BOOK:
"Write efficient ZX-81 BASIC". "Amazing": Sinclair User, Jan. 1983. An essential follow-up to the Sinclair Manual.

CASSETTE 1 (1K):
"Sweet Sixteen" 16 great 1K BASIC programs (8 action games, 8 general interest).

CASSETTE 2 (16K + printer):
"Wordkill" Word-processor: 210 lines of 42 characters; lower case, etc; full line-by-line manipulation; 30 char./secs. printing.

Each item (including VAT/P&P) — **£5.00**. Send orders (with cheque/PO), specifying item(s) required and your name/address, to:

IVOR KILLERBITE
10 Elson Road, Formby,
Liverpool L37 2EG.

AMAZING 3DMAZE 16K SPECTRUM. Features include full perspective, maps, compasses, potions, oxygen. C60 cassette, instructions, variables, listing, racing driver, mastermind free. Just £2.50. Mr M Elson, 12 Southbrook Close, Havant, Hants, PO9 1RW.

PROFESSIONAL EDUCATIONAL SOFTWARE

Spectrum 16K and 48K. Primary School Level

Program Package Titles include: Time, Area and Perimeter, Shopping, Hangman, Maths Race, Shapes, Abacus Place value.

Designed by a practising primary teacher, **programmed** by a computer professional.

Full user documentation included with each cassette.

£4 each program package plus 50p p&p per order, or 7 for the price of 6.

Cheque/PO or SAE for details to:

ASHFIELD SYSTEMS ASSOCIATES
Ref. EdS11, 46 Qualitas,
Bracknell, Berks. RG12 4QG.

HOME HEATING and Energy program. ZX-81 16K calculates heat requirements, estimates running costs, evaluates the effect of improved insulation. Send £6.50 to J. Virgo, 22 Kings Ride, Burgess Hill, Sussex.

SPECTRUM 16K & 48K

High quality, low cost arcade style games using FULL COLOUR GRAPHICS & SOUND

CASSETTE 1 — Bombrun, Asteroids, Defender Missile, & Batrun, at only £5.50

CASSETTE 2 — Alien attack, Subhunt, Startrek & Lemmings, at only £4.50

CASSETTE 3 — Space intruders, at only £2.95. Match your wits against the alien forces

SPECIAL OFFER — all 3 cassettes for £9.95.

R. Bhattacharya, (Dept. SU), 3 Wensley Close, Harpenden, Herts.

FIREWORK MUSIC

An educational game for the **16K Spectrum**, designed to develop speed in music reading. Players learn to read notes in the treble and bass clef while they enjoy an attractive game with colour graphics and sound. There are firework displays as rewards but your firework box is blown up by falling sparks if you're too slow. Pace increases with score to encourage quick reading. Ideal for home or school use by music beginners, 2 programs on cassette, for **16K Spectrum** (or a similar **16K ZX81** version) cost **only £5.00.**

SOFTWARE COTTAGE, 19 Westfield Drive, Loughborough, Leics. LE11 2QJ.

ZX-81 REPAIR SERVICE

At last no need to wait for weeks, send your faulty ZX-81 for a fast reliable repair.

We will repair any ZX-81 kit or Ready Built Unit.

Please describe the fault briefly and send a cheque/postal order to:

NEXT COMPUTER SYSTEMS
88 Harvest Road
Englefield Green
Surrey TW20 0QR

ONLY £15.95 + p&p £1.75
fully guaranteed.

MAIL ORDER ADVERTISING

British Code of Advertising Practice

Advertisements in this publication are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is paid in advance, the code requires advertisers to fulfil orders within 28 days, unless a longer delivery period is stated. Where goods are returned undamaged within seven days, the purchaser's money must be refunded. Please retain proof of postage/despatch, as this may be needed.

Mail Order Protection Scheme

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, *Sinclair User* will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided:

(1) You have not received the goods or had your money returned; and

(2) You write to the Publisher of *Sinclair User* summarizing the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

Please do not wait until the last moment to inform us. When you do write, we will tell you how to make your claim and what evidence of payment is required.

We guarantee to meet claims from readers in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent (up to a limit of £4,250 per annum for any one Advertiser so affected and up to £10,000 per annum in respect of all insolvent Advertisers. Claims may be paid for higher amounts, or when the above procedure has not been complied with at the discretion of *Sinclair User*, but we do not guarantee to do so in view of the need to set some limit to this commitment and to learn quickly of readers' difficulties).

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine (not, for example, payment made in response to catalogues etc, received as a result of answering such advertisements). Classified advertisements are excluded.

Sell your used computer or peripherals through Sinclair Supermart at low cost . . . up to 30 words for only £5.

Have you updated your computer or do you no longer use that add-on? Instead of leaving it lying around, turn it into cash be placing a classified advertisement in Sinclair Supermart and reach around 65,000 users of the Sinclair ZX systems. Please write your advertisement in the boxes below, one word per box. Underline words required in bold type. Your name, address and/or telephone number should be included *Please print in block capitals.*
Note—this service is open only to private advertisers. The advertisement will appear in the earliest possible issue.

Name: . . . .
Address: . . . .
. . . . Tel: . . . .

Have you included the fee of £5?

Conditions
The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Proprietors are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertisers shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libellous or malicious matter or untrue statement in any advertisement published for the advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

ADVERTISEMENT INDEX



BUG-BYTE SOFTWARE, MORE THAN A GAME ...IT'S A DOOR TO ANOTHER DIMENSION !

All about me was darkness. Tens of thousands of screens stared blankly into space. Minds drifted aimlessly, dulled by lack of stimulation. The world was grey, drab, lacking . . .

Then suddenly it happened. First one, then another, then tens, hundreds, thousands of tired screens felt a surge of power and flickered back into life. They were much as I had seen on my own planet's microcomputers – the ZX 81, ZX Spectrum, Vic 20, BBC Micro and ORIC-1.

The minds paused to take stock. They clustered round the screens, their nimble fingers excitedly flicking the controls back and forth. At last they had found a challenge . . . action and adventure with cunning tests of dexterity and reaction. Everywhere, conversation was of Asteroids, Mazogs, Panic, Another Vic in the Wall.

Unable to resist, I too had a closer look. There before me was vivid colour, high resolution graphics. I could practically feel the spine-tingling sound effects as whole battle fleets of Cosmiads swarmed out of nowhere and attacked. I should have known. As my fingers raced over the controls, and I prepared to stand and fight with only a single laser bolt for protection, I realised I was trapped!

Too late now, I remembered this was no ordinary software. I'd been warned, as I now warn anyone buying from Laskys, W.H. Smith, Currys Micro C, Spectrum and larger branches of Boots, and a nationwide network of dealers stocking Bug-Byte. Because Bug-Byte is more than a game, it's a door to another dimension. One that I had opened.

BUG-BYTE SOFTWARE

100 The Albany, Old Hall Street, Liverpool L3 3AB